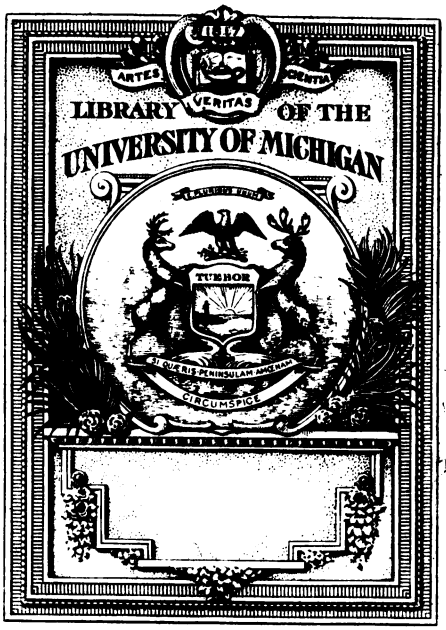

ARTES
VERITAS
SCIENTIA
LIBRARY OF THE
UNIVERSITY OF MICHIGAN
TUEBOR
SI QUAERIS PENINSULAM AMOENAM
CIRCUMSPICE

Destructive Lumbering in the Coast Redwood Belt, California

OUR

ESTHETIC [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

NEW YORK
MITCHELL KENNERLEY
8 East 29th Street

OUR WASTEFUL NATION

The Story of American Prodigality and the Abuse of Our National Resources

By

Rudolf Cronau

With Illustrations

NEW YORK
MITCHELL KENNERLEY
2 East 29th Street

CONTENTS

"Of all the sinful wasters of man's inheritance on earth, the very worst are the people of America."—SHALER.

"The story of the awful waste of our most valuable natural resources is one of such a disgraceful character that its exposition to the world is necessarily mortifying to all patriotic Americans; but a sense of duty to our common country compels that the truth be told, however humiliating to our national pride."

DR. I. C. WHITE
State Geologist of West Virginia.

PREFACE

Of all conferences ever held at the White House, the seat of our Executive government, none was of such importance and so memorable as the one held in the second week of May, 1908.

Following a call of President Roosevelt the Governors of all the States and Territories assembled to consider the questions concerning the conservation and use of our natural resources, which are fundamentally responsible for the prosperity and the wealth of the American people.

The conference, lasting from May 13th to the 16th, was attended not only by the Governors and their advisers, but by all the members of the Cabinet, and the Supreme Court: further, by many members of Congress, by the presidents of our great universities and scientific societies, and by numerous representatives of national organizations interested in the different phases of preserving our natural resources.

In the address with which President Roosevelt opened the session, he explained the question put before the assemblage, "*as the weightiest problem now before the nation*, as nobody can deny the fact, that the natural resources of the United States are in danger of exhaustion, if the old wasteful methods of exploiting them are permitted longer to continue. The enormous consumption of these resources, and the threat of imminent exhaustion of some of them, due to reckless and wasteful use, once more call for common effort and common action."

Was there really any need for such a meeting? Is it

not mere theory, that our national resources are threatened with exhaustion? Were we not taught in our schools, by our newspapers, orators, and statesmen, that this land of ours is among all countries of the world the richest? That its abundance is beyond conception and sufficient for all generations to come? So many Americans may ask, unwilling to part with a belief which became with the American people almost as deep rooted as a religious dogma.

To find the truth, is not an easy matter. We must study not only the economical history of our country, but the history of its fauna, flora and mineral resources. We must investigate the many reports of the U. S. Forest Service, the Bureau of Fisheries, the Geological Survey and many others.

These books and official documents differ greatly from the assertions of our boasting, spread eagle orators. Not given to flattering, they convince us of the deplorable fact that the natural resources of America indeed are threatened and that the story of American waste is amazing—both for its extravagance and for its stupidity.

The following chapters are intended to give an idea of the enormous waste of which our people are guilty. They were written and compiled in hope that they might teach the lesson, that it is well to economize in the days of plenty, so that we may have sufficient in the days of need.

Our Wasteful Nation

I

THE LAND OF "INEXHAUSTIBLE RESOURCES"

When in July, 1584, Sir Walter Raleigh and his followers landed on the eastern coast of the North American continent, they found what our short national life has demonstrated beyond dispute: the richest and finest land on the face of the globe.

The unsurpassed beauty and grandeur of the scenery stirred their hearts with admiration as well as surprise. They became enthusiastic about everything, and described in their reports the newly discovered country, "Virginia," as the most wonderful land they had ever seen. "Its soil," so Raleigh writes, "is most plentiful, sweet, fruitful and wholesome, and the people most gentle, loving and faithful, void of all guile and treason, and such as live after the manner of the Golden Age. The many goodly woodes are full of Deere, Conies, Hares and Fowle, even in the middest of summer, in incredible abondance. The Woodes are not such as you finde in Bohemia, Moscovia, Hercynia, barren and fruitless, but the highest and reddest cedars, far bettering the cedars of the Azores, of the Indies, or Lebanus; Pynes, Cypres, Sassaphras, the Lentisk, or the tree that bearest the Masticke, the tree that bearest the rind of blacke Sinamon. And it is full of grapes, of which we found such plentie as well on the islands as on the sand and on the greene soile, on the hills as in the plaines, as well on every little

shrubbe as also climing towards the tops of high cedars, that I thinke in all the world the like abondance is not to be found, and myselfe having seene those parts of Europe that most abound, find such difference as were incredible to be written."

The more the Europeans saw of America, the more their amazement increased. When Henry Hudson in 1609 discovered that noble river, now bearing his name, its magnificent shores appealed to him, who was accustomed to the modest surroundings of the Netherlands, like a revelation.

The French explorers, who entered North America by the way of the St. Lawrence River, met still greater surprises. The Great Lakes, stretching like oceans toward the setting sun, the thundering Niagara, the royal Ohio, the majestic Mississippi, and the beautiful forests girding their shores, made their hearts beat with wonder and delight and filled their imagination with dreams of vast empires full of wealth. Beyond the "Father of Waters" and the regions of forest, the Frenchman found the "Prairies," boundless seas of fragrant grass and beautiful flowers. Beyond these plains rose majestic mountain chains, rich with lovely valleys and parks, rich with snow-capped domes, towering above the clouds. And still farther west beyond the Rocky Mountains and Sierras spread other lands, wonderful combinations of everything man can wish for his abode, and filled with scenery which no pen is able to describe. Upon this marvellous continent nature had lavished an amount of treasures beyond belief. The wide forests and plains were tracked by countless multitudes of buffalo, deer, elk, moose, antelopes, goats, sheep, bear, mountain lions, wolves, otters, beavers and other valuable game and fur animals. The

sky frequently became darkened by enormous flights of pigeons. In the depths of the forests wild turkeys, and upon the plains large flocks of fowl, were encountered. Rivers and lakes swarmed with geese, ducks, and incredible masses of trout, bass, salmon, and other food fishes. The oceans provided the choicest oysters, lobsters, crabs, turtles, shad, and mackerel.

Nature also deposited wonderful wealth beneath the soil. The Alleghanies and Rocky Mountains proved the richest among all ore-bearing mountains of the globe. Gold and silver were found in enormous quantities. In its wealth of coal, copper, iron, and petroleum, North America stands unsurpassed. Lead, quicksilver, zinc, salt, and other valuable minerals are abundant. And besides, there are enormous masses of magnificent building stones.

The climatic conditions of the country are most favourable, as it lies entirely in the temperate zone. Its northern extremities do not reach into the forbidding arctic region, nor its southern parts into the unnerving tropics.

The geographical situation between the two greatest oceans is most excellent. Splendid ports open in the East as well as in the South and West. In the North the Great Lakes provide for an unlimited Commerce.

Besides the United States enjoy a most exceptional system of rivers and waterways, among which that of the Mississippi has in its magnitude no counterpart. Its mighty arms reach into the Alleghanies as well as far into the Rocky Mountains. Not less than 20,000 miles of this wonderful system are navigable, thereby making 22 States accessible from the ocean. The virgin soil is splendid and guarantees for the settler rich harvests.

So North America presented itself not only as a con-

tinent of enormous dimensions and magnificent scenery, but also as a vast storehouse of nature, filled with all kind of treasures.

Let us see if the Americans made proper use of that rich inheritance which fell to them.

II

THE DESTRUCTION OF OUR FORESTS

When the first hardy colonists landed on our shores, the area now encircled by the boundaries of the United States was covered with about 62 per cent forest, 8 per cent brush, while the remaining 30 per cent was open country. The forests, like a mighty unbroken sea, covered the entire east and the centre of our continent in such density and luxuriance, that they were not a blessing but a hindrance to the settlers, who only with the greatest difficulty were able to clear amidst this mass of vegetation the spaces needed for their cabins.

To-day 18 per cent of our territory is under cultivation; 24 per cent remains open country; 28 per cent forest, while the brush land has increased to almost 30 per cent. This increase of the brush land is chargeable to only one cause: the destruction of the forests.

As man made himself master over everything on the earth, so he won his battle against the forest. The settlers felled it, smashed it, burned it, till they got all the room they wanted. Their children followed this example and destroyed the forest with the same recklessness they would have used against their worst enemy. Surely, it is a reminiscence of those hard pioneer days, that so many Americans neither love nor respect trees, but have only one thought about them, and that is to cut them down.

The rapidly growing immigration, the erection of new homes for a multiplying population, the creation of new settlements, towns and cities increased the demand for lumber and enhanced its value. Great quantities were

needed to build houses and stables, to provide furniture, wagons, vessels, boats, bridges, roads and a thousand other things. Large quantities were required in regions, here and abroad, where wood was scarce, and thus originated the lumber industry of America, which developed in time to one of the most important and most successful enterprises of the nation.

The lumber trade is a legitimate industry, and one that should be so cherished as to insure its profitable permanency. But not all men thus engaged made proper use of it. The large fortunes flowing into their coffers awakened the greed for more, and in haste to get the best and most valuable, the forests were wantonly destroyed.

Nobody cared. Nobody had ever heard yet of "making conservative use of the forest." What for? For whose benefit? Were not these forests, the limits of which no one had ever reached, inexhaustible?

And thus the wasteful and destructive forms of lumbering of the pioneer days were followed by all succeeding generations up to the present day.

This fact is illustrated by the description of eastern lumber camps, as we found it in one of our leading magazines. "In the Maine and New Hampshire forests thousands of men spend the winter cutting the forests of the choicest lumber and destroying young growing trees on every hand in their haste to get ready for the high water in the spring. All the big sound trees of a desirable species are cut without regard to their surroundings; withdrawing the necessary shelter from a crop of seedlings in one place, killing others in the fall and removing of the timber; here felling all the seed trees, so that there will be no reproduction; there clearing the way for a worth-

less species that will promptly choke out the valuable ones; cutting the best sections from the fallen timber, and leaving the tops and boughs and parts of the trunks to dry and rot and litter the forest floor with highly inflammable rubbish. Those parts of the timbered forest that do not degenerate into mere brush, grow a thin second crop of very inferior lumber, and sooner or later the inevitable spark, dropped by the locomotive or the camper or the lumberman himself, finds its way into the dry refuse, and what is left of a thousand acres or a thousand miles, as may be, of woodland, goes up in flame."

Speaking about the conditions in Wisconsin, Governor James O. Davidson said at the conference of the Governors, at Washington, that only a few decades ago the northern and eastern parts of Wisconsin were one broad forest, broken only by occasional stretches of prairie land. Pine, hemlock, oak, and maple grew in such abundance that it was the State's proud boast that Wisconsin alone could supply the whole country with timber for a century. Amid its great forests were swamps and hundreds of small lakes, from which deep, swift streams rushed to form the rivers that added their volume to the Mississippi. But, with its great forest wealth and its immense water power, Wisconsin, like its sister States, lived only in the immediate present. Great timber companies, inspired only by an enthusiasm and a greed which knew no bounds, attacked these forests, engaging in a mad race each to strip its territory, to market its lumber first, and then to move forward and continue the destruction. No tree was regarded as too small to escape cutting. Trunks six inches in diameter were cut for lumber. Millions of young trees and saplings, too small to have any commercial value, were crushed by falling timber or were cut

to make room for logging roads. Those that escaped the axe of the loggers fell victims to forest fires, the destruction by which can only be counted by the millions of dollars—a further melancholy evidence of the carelessness with which our forest tracts were guarded. To-day Wisconsin is beginning to feel the penalty for this indifference. Its proud position as the greatest timber State of the Union has passed to others.

The lumbermen of our Northwestern States differ from their brethren in the East in their methods of lumbering, but not in the amount of waste produced.

In speaking of the vanishing forests of these States, a writer says: "Nearly 200,000 men are employed in cutting down the last primeval forests of this country and slicing these stately armies of spruce and fir and cedar into 5,000,000,000 feet of lumber and 6,000,000,000 shingles every year. This timbered area is the richest natural treasure of the American continent, compared with which the gold mines of Alaska and Nevada are of picayune value. It is a treasure so wonderfully rich that its owners are squandering it like drunken spendthrifts. A billion feet of lumber is wasted every year; enough to build 100,000 comfortable American homes. It is characteristic of Western men and methods that the ways of logging in the East should have been flung aside as crude and slow. The giant timber of the Washington forests on the slopes of the Cascades is not hauled by teams or rafted down rivers. Steam has made of logging a business which devastates the woods with incredible speed, system and ardour The logging camps of the Cascade Mountains differ as strikingly from the lumbering centres of Northern England as the electric gold dredges of the Sacramento Valley contrast with the placer diggings of

the 'Forty-niner. In other words, the greater the need of preserving the forests, the greater is the American ingenuity for turning them into cash as fast as possible."

And in June, 1908, Dr. H. Stanley Bristol, chief of the "Section of wood chemistry of the U. S. Forest Service," gave to a *New York Herald* reporter the statement, that the Forest Service in its investigation has found that 50 per cent of the average tree as it stands in the forest is wasted before reaching the market in the form of lumber. The waste is approximated as follows: Bark, 11 per cent; sawdust, 15 per cent; slabs and edgings, 24 per cent. Vast quantities of material in the form of large slabs which might easily be handled and prepared for cooking processes, are constantly being burned simply to get them out of the way. Immense logs, the butts of giant trees, are left in the woods, because "It does not pay to get them out at the present price of lumber."

"The waste of our timber resources has been deplorable," so Dr. Bristol concluded his remarks. "The cut of yellow pine in this country last year (1907) was 12,000,000,000 board feet. Of this cut more than 8,000,000 cords of actual wood, exclusive of the bark, went to waste. Aside from the wood fibre, if the turpentine alone which was contained in this amount of material had been extracted, there would have resulted a gross saving for the year which would have easily reached $14,000,000."

"In the West," so John Ray Smith explains in an article, "trees in the lumber districts seemed to mean nothing except something to destroy. Hundreds of thousands were cut merely to form fence lines; the trees chopped off at a height of 6 feet; wires connecting those stumps forming the enclosure, and the tops of trees a hundred feet high and containing thousands of feet of

good board measure, being tossed away to decay. Millions of trees have been burned in forest fires, set by rascals and allowed to burn by shiftless 'don't cares,' but beyond such sources of loss is the great and continuous every day waste; a waste which occurs in the cutting of trees; in sawing; in splitting; in fact, in every way the product can be wasted."

To illustrate this every day waste the same author compares the American tie-cutter with the same class of man in Germany. "The American tie-cutters are the most wasteful of all men engaged in that industry in the world. About 78 per cent of every tree attacked by them is wasted, so that over 250,000 cubic feet of wood was thrown away in the getting of the 78,000,000 of hewed ties the railroads needed last year. In Germany, where forestry is a study that has been carefully nursed for 150 years, tie-cutting is a science; and the German wastes only between 30 and 35 per cent of his log."

Foreigners, visiting our land, are amazed at the amount of wood wasted everywhere. A friend of mine, a German forester, when returning from a trip through the continent, said to me: "You may travel wherever you want and you will see the rotten or burned trunks of noble trees, the naked limbs of which point to heaven as so many silent accusers against the frivolous wrong of man against nature. The most beautiful scenery of America is spoiled and disfigured by these desolate settings."

As already indicated, the rude forms of lumbering adhered to in America, up to the present day, are also responsible for most of the fires, which play such a great part in the destruction of American forests. The losses, caused by this element, are varying, of course, from year to year. Generally they amount to about $25,000,000

annually, but quite often they rise very much higher, when entire villages and settlements become the prey of forest fires and go up in smoke.

One of the most terrible tragedies that befel our continent was the great fire which, at noon of October 7th, 1825, started near the Miramichi River, New Brunswick, and in less than nine hours destroyed not only 2,500,000 acres of forest, but the villages Newcastle, Chatham and Douglastown; 160 persons, 1,000 head of cattle, enormous quantities of game, and many millions of fish perished.

Another fire in October, 1871, consumed more than 2,000 square miles of forest, and besides, the town of Peshtigo, Michigan, where 1,500 people lost their lives. In 1880 a similar calamity laid more than 1,800 square miles of forest in ashes, destroyed property to the value of $2,300,000, killed 150 people and made 5,000 persons homeless.

One of the most dreadful forest fires of modern times happened in September, 1894, in Minnesota, resulting in the loss of 7 towns and villages, and in the death of 500 persons; 2,000 people lost their homes, and the value of destroyed property amounted to $25,000,000. As investigations proved, this disaster might have been prevented, as after its outbreak the fire, for several days, made such slow progress that it might have been extinguished easily within an hour. But nobody cared, until a fierce storm sprang up, which turned the smouldering flames into a roaring sea of fire.

During September and October, 1908, our newspapers gave again thrilling accounts of fearful losses and tragedies caused by the forest fires in northern Michigan, Wisconsin, and Minnesota. Many towns, among them

that of Metz, were wiped out of existence and numerous families perished in the flames, while trying to fight their way to safety. The upper part of the lower peninsula of Michigan was swept by a seething wall of flames 10 miles wide and 70 miles long, destroying towns, railroad and lumber camp buildings, thousands of acres of standing timber and many thousands of cords of piled and sun-dried logs and ties. From the earth the flames reached upward a hundred feet, and above it hung the yellow pall of smoke that topped the roaring furnace. The saving of anything was out of the question, and the toll of human life was paid with that of mere earthly property.

Bishop Charles D. Williams, of the Protestant Episcopal Diocese of Michigan, when returning from an overland trip to Cheboygan, described the conditions in these parts of the State as follows: "The whole country is a veritable firetrap. The woods are full of dry fallen timber, left by the old lumbermen, and slashing and old mills with seasoned lumber are everywhere. There are not sufficient clearings about the towns and no fire protection. Everything is parched with drought, yet the people carelessly clear the lands with fires.

"It is simply miraculous that more towns do not go like Metz. The situation demands, first, reforestation to cure the frequent and persistent drought; second, stringent statutes requiring lumbermen to clear the forests of débris now carelessly left, and requiring the mills and town and railways to provide adequate protection and wider clearings, and forbidding under severe penalty the careless use of fire. But chiefly officials are required, who will vigorously enforce such laws, and public sentiment that will back them up in so doing. Unless we

Total Destruction of a Pine Forest by Fire, Idaho

quit our greedy, wasteful and careless ways we shall have many horrors worse than Metz."

McClure's Magazine of November, 1908, has an article: "Fire—an American Extravagance," in which it is said that the whole damage done by forest fires in the month of September, 1908, was at a conservative estimate at least $270,000,000!

* * *

Wasteful as are the Americans in their methods of lumbering, so are they in the consumption of the products of their forests. The per capita consumption in 1907 was 500 feet, while in Europe the average is but 60 feet, or less than one-eighth of the American consumption.

Rapidly as the population of the United States has increased, the consumption of lumber has increased still more rapidly. In 1880 the timber cut was 18,000,000,000 board feet; in 1890, 24,000,000,000 feet; in 1900, 35,000,000,000 feet, and in 1906, 50,000,000,000 feet. The increase in population from 1880 to 1900 was 52 per cent, but in lumber cut 94 per cent.

The legitimate demands in forest products are simply stupendous and are increasing every day. In 1906 the lumber production for building purposes was 37,550,736,000 board feet.

The mines consumed 170,000,000 cubic feet of round timbers. The railroads required 102,000,000 ties; the telegraph, telephone, and electric light companies purchased 3,493,025 round poles exceeding 20 feet in length. The shingle production amounted to 11,858,260,000; the production of tight cooperage stock reported to over 267,000,000 staves and 17,700,000 sets of heading,

and that of slack cooperage stock to 1,097,063,000 staves, 129,555,000 sets of heading, and 330,892,000 hoops; 326,000,000 feet of timber were used for veneer. The production of lath was 3,812,000,000; 2,900,000 cords of domestic wood and 738,000 cords of Canadian wood were converted into pulp for newspapers and magazines. Distilleries consumed 1,195,130 cords of wood; and tanneries 1,370,000 cords of bark.

How many millions of posts and how many million cords of firewood were used, nobody knows.

As Mr. R. S. Kellogg, chief of the "Office of Wood Utilization," says, in circular 129 of the Forest Service: "All statistics and conservative estimates indicate that our present consumption of wood in all forms is equivalent to at least 100,000,000,000 board feet annually, and possibly much more. Indeed, one leading authority has estimated that the total use of wood in the United States is equivalent to 150,000,000,000 board feet!"

No forests, no matter how large they may be, can stand such an enormous drain for long. And so we need not wonder that the supply of some of the most desirable woods of the United States is nearly exhausted. As for instance, the white pine, which from the standpoint of commercial use ranks first among the various woods. Formerly it was the greatest of all our lumber trees and the only wood dignified with the name "pine." Twenty years ago the supplies were called "inexhaustible." To-day the same trade journals, which decried those who predicted the rapid exhaustion of this most important staple of our lumber market as "denudiatics," agree that the white pine is doomed.

The original stand of white pine in the Lake States was about 350,000,000,000 feet. The census estimate in

1900 indicated that the amount had gone down to 50,000,000,000. Since that time the inroads made on that tree have been so large that its domination of the lumber market has practically ceased.

Since 1895, several hundred firms, engaged in the pine lumber business, have retired in consequence of the exhaustion of their timber supply. In some States, in Michigan and Wisconsin for example, white pine has entirely disappeared commercially. On account of the disappearance of the white pine, lumbermen are now obliged to classify as "pine" all sorts of pine, formerly not highly estimated: the Southern yellow pine, the jack pine, pitch-pine, etc. But the drain on these woods has become so enormous, that within ten to fifteen years there will be a most serious shortage of pine wood. The census of 1880 estimated the amount of standing Southern yellow pine at 237,000,000,000 feet. The "Pacific Lumber Trade Journal" of January, 1907, placed the present stumpage at 137,000,000,000 feet. As the present annual cut is about 12,000,000,000 feet, it is evident that the supply of yellow pine within ten years will be just as limited as that of white pine now. The same will be the case with the Douglas fir, which at present is another leading kind of lumber on the market.

Of the hard woods thirty years ago only oak, hickory, elm, ash, walnut, cherry, maple and birch were acknowledged. Now cottonwood, beach, sycamore and all other woods, that will saw into boards, are added to the list. The present amount of hard woods is very indefinitely known, but it is sure that it is rapidly decreasing.

That the decrease is due to diminished supply rather than to lessened demand is proved beyond question.

Oak, which in former times furnished more than half of the entire output of hard wood lumber, fell off 36 per cent; yellow poplar 37 per cent; elm went down 50 per cent. The more superior woods, as maple and cottonwood, have on the contrary increased tremendously. The prices of all the better hard woods have advanced. White oak went up from $48 in 1890 to $80 and $85 in 1907; hickory from $38 to $65; yellow poplar from $29 to $53.

Wm. L. Dall, assistant forester, in his report about the waning hardwood supply, September, 1907, explains as follows:

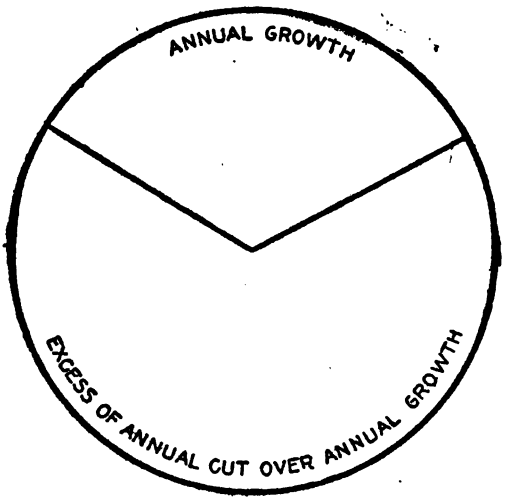
"There is sure to be a gap between the supply which exists and the supply which will have to be provided. How large that gap will be depends upon how soon and how effectively we begin to make provisions for the future supply. The present indications are that in spite of the best we can do there will be a shortage of hardwoods running through at least fifteen years. How acute that shortage may become and how serious a check it will put upon the industries concerned cannot now be foretold. That it will strike at the very foundation of some of the country's most important industries is unquestionable. This much is true beyond doubt, that we are dangerously near a hardwood famine and have made no provision against it."

But the deplorable effect upon the forests of lumbering without regard to the future, will be felt not only in the hardwood industries but by the whole nation.

It is a well-known fact that the wasteful forms of lumbering, together with the ravages made by fire and insects, are destroying our forest resources far more rapidly than they can be replaced. The annual consumption of wood is probably three times greater than the annual

growth. And the estimates of standing timber in the United States are by no means satisfactory.

The amount at present is estimated to be somewhere between 1400 to 2000 billion feet. The total quantity used for lumber and other products was in 1907, as R. S. Kellogg, chief of the "Office of Wood Utilization" stated, equivalent to 50,000,000,000 feet board measure. Provided that this rate would not increase and that there would be no waste or loss by fire, the timber would last from 28 to 40 years. But if we increase our consumption to 100,000,000,000, all our timber will be gone in fourteen to twenty years. And then the American nation must suffer the hardships, as yet unknown, of a timber famine, because it has wasted its forests, one of the great fundamental conditions of success.



III

THE WASTE OF WATER

All natural resources are interdependent. Forests cannot exist without a sufficient supply of water; and a permanent supply of water, the most valuable of all resources, can come only with the wise use of the forests. There is no other way. Therefore, because the Americans wasted their forests, they destroyed also their store of water, which, as was assumed, was just as "inexhaustible" as the forests.

Had not these thousands of brooks and creeks, gushing and rushing from hills and mountains, been there all the time? Had not these noble streams and rivers, meandering through the fertile valleys, been the great highways, upon which the first explorers and colonists penetrated far into the unknown interior? And had they not, for centuries, supplied the settler with all the moisture he needed for his crops?

As these rivers had run in the past, so, people believed, they would run for eternity. But when the woods had been cut down, outraged Nature taught us a lesson. The great beds of moss and leaf-mold, hitherto perennial reservoirs of moisture, dried up. Slowly the springs and pools began to disappear. The creeks and rivers, once flowing constantly the year around, and full of water, changed. In spring time they became, for a few weeks, rushing torrents, causing disastrous freshets and overflows, while during summer and fall their beds ran dry, leaving the country parching.

The Hon. John F. Lacey, Representative in Congress

from Iowa, described his experiences before the "American Forest Congress" in January, 1905, as follows: "I was born in the woods of Virginia, but moved to the prairies. One of the most unpleasant things of my subsequent life was to return to my former home and find that the old streams and the holes we used to swim in, and where we used to go fishing, had become gravelly roads. They are highways as dry, as arid, as one of the deserts of Arizona or New Mexico. Why is it? Because the trees have been cut down and the springs, the children of the forest, dried up. Instead of a slow-running brook, digging out holes here and there clear as crystal, we have simply a torrent carrying the pebbles and sand from the hills, and then a desert."

That this picture is not at all overdrawn, but true, can be proved by many other examples. Let us take for instance the Ohio. It was in former times one of our most regular rivers, always with plenty of water, allowing steamers and flatboats to run. But by the removal of the forests in the Alleghany Mountains the river became a most unreliable waterway. In spring it overflows many cities and villages with water 8 to 15 feet deep, while in summer and fall it almost dries up. In September, 1908, its water became so low, that in many places the bed could be crossed with wagons, while steamers, and flatboats sat high and dry upon enormous sandbars, unable to move for many weeks. In some places the water had sunk to 8 inches, and children could be seen playing, where a few months ago had rushed a mighty river.

This enormous drought affected not only navigation but all other industries as well, as many coal mines and factories were forced to close down for lack of water.

Trout and other valuable fish perished by the thousands. In the Anthracite regions of Pennsylvania water became so scarce, that the farmer brought it to market instead of vegetables, and sold a gallon for 8 cents.

Similar serious conditions pertained to the regions of the Delaware and the Susquehannah, to the New England States as well as to the South, in short wherever human greed had robbed the mountains of their green mantles.

While many parts of the United States suffer want, in other parts, especially in our great cities and centres of industry, water is wasted in almost incredible quantities.

The city of New York consumes 475,190,000 gallons of water daily, or, with a population of 4,353,461 persons, not less than 109 gallons daily per capita. Of this enormous quantity probably 90 per cent is wasted. In other localities, especially in the far West, the limited supply of artesian water available for irrigation and other purposes is being wasted on a considerable scale by being allowed to flow continuously when not needed; or in excess of actual need.

Another great waste of our water resources results from the neglect to make them commercially useful. It is a fundamental conception that every waterway should be used to the utmost and be made to serve the nation as largely and in as many different ways as possible. Especially, when a country is blessed with such splendid streams and channels as the United States.

The inland waterways of the Union comprise about 25,000 miles of navigated rivers. A nearly equal mileage of streams can be made navigable by the improvement of their channels and the regulation of the flow of their waters. Further we have the five Great Lakes with a combined length of 1,410 miles, and 2,120 miles of oper-

ated canals. In addition to these rivers, lakes and canals there are 2,400 miles of sounds, bays, and bayous, capable of being converted by means of connecting canals aggregating less than 1,000 miles in length, into a continuous and safe inner route for the coastwise traffic of the Atlantic and Gulf. These combined waterways, rivers, canals, lakes and coastal channels, have an aggregate length of between 55,000 and 60,000 miles, and are better adapted to the needs of the people than those of any other country. In extent, distribution, navigability and ease of use, they stand first.

Yet, as President Roosevelt explained in a message of February, 1908, to the Senate, the rivers of no other civilized country are so poorly developed, so little used, or play so small a part in the industrial life of the nation as those of the United States.

It is a fact that although the Federal Government has in the last half century spent more than a third of a billion dollars in waterway improvement, and although the demand for transportation has steadily increased, navigation on our rivers has not only not increased, but has actually greatly diminished. So for instance, on the Mississippi, for which Congress up to 1907 made appropriations amounting to $208,484,720. A half century ago the traffic on this greatest of all natural highways upon the globe was without a rival in any country. Now this traffic has decreased enormously. The decline of navigation in the inland waterways is, as the "Inland Waterways Commission" reported, due to the unregulated railroad competition which prevented or destroyed the development of water traffic. This was done by keeping down the railroad-rates along the rivers, recouping themselves by higher charges elsewhere. The railroad com-

panies drove out commerce by discriminating tariffs, by rebates, by adverse placement of tracks and structures, by acquiring water fronts and terminals, by acquisition or control of competing canals and vessels, and by many other means. So the railroads have secured throughout the country control of the waterways, and prevent their use. And this is done in spite of the fact, that the railroads, at periods recurring with increasing frequency, are utterly unable to keep pace with production or to meet the requirements of transportation. Instead of assisting each other for the benefit of the whole nation the railways selfishly injure the waterways and withhold from the people in general these means of cheaper transportation.

The great importance of waterways as freight carriers is best illustrated by the fact that, at present it costs $4.70 to carry a ton of wheat by rail from South Dakota to Chicago. With 6 feet of water in the Missouri River this ton of wheat could be shipped to St. Louis or Chicago for 70 cents, saving the $4. Wherever water commerce prevails, the ton goes a thousand miles for $1 or less, while the railroads charge for the same haulage and distance $7.50.

The great need and importance of better waterways is explained in a splendid article, written for the December number, 1908, of the *Cosmopolitan Magazine*, by Herbert Quick. He says: "Tonnage in this country increases six times as fast as railway facilities increase. The first thrill of good times will be choked back into depression by railway paralysis,—car-shortage, congested terminals, lack of motive power, lack of trackage, and the old story of 1906-1907—unless we provide some way of carrying the trade of this wonderful continent. An incredible amount of perishable material—corn, cotton, and wheat

—is destroyed every year in the South and West because the railways cannot handle it with despatch. A proper waterway system would enable this low-class freight to be promptly carried, and allow the railways to handle high-class freights.

"The development of waterways is no untried experiment. The nations of western Europe have poured out billions for canals, canalized rivers, and deepened channels, until they have a mile of waterway for every twenty-three miles of land. Their products get into the world's trade at salt water with a freight charge less than one-tenth, perhaps, of that which our railway-served producers have to pay. This is one reason why we are making no more rapid progress in foreign commerce; and if we were to eliminate our foreign trade which gets to the sea by waterways our progress would turn into a decline. And not only Europe is showing us the way in such matters, but the South American competitors of our farmers are carrying deep water closer and closer to the farms. The Parana, in the Argentine wheat-district, has been deepened for a thousand miles, and on the La Plata, in the heart of the wheat-district, Argentina is spending $15,000,000 on the harbour of Rosario. The South Dakota farmer, with his wheat-rate of $4.70 a ton to Chicago, will feel this when the pinch of hard times or overproduction comes.

"The other progressive nations of the world regard the waterway as a sort of thumb to the finger of the railway —members that must work together. They do not allow the finger to cut off the thumb, as we have done. They say that water-competition does the railways good, by taking the skim milk of the heavy tonnage and leaving the railways the cream. Railways which compete with

waterways make more money than do the lines which have everything to carry. Our railway magnates are beginning to see this, and men like Hill, Harahan, and Finley are strong advocates of waterways. If they would only make their traffic men treat the rivers as European rivers are treated by railways, it would help greatly. We have adopted the remarkable policy of leaving the stream unfit for commerce until commerce has developed on the unfit stream.

"This policy renders worthless some of the best material assets of the nation. Take coal for instance. The lignite beds of Montana and the Dakotas are the greatest coal-measures in this country. The technological branch of the Geological Survey has found that this coal, turned into producer gas, will furnish more power—two to one—than the best anthracite used in a steam-engine. Our coal is being used up at a terrific rate. It is perfectly certain that these great low-grade coal-measures will come into use, that great industrial communities will be founded upon them, and that a great commerce in coal must eventually spring up on the Missouri if the west arm of the Mississippi cross is improved. Millions of tons of anthracite and bituminous coal are yearly shipped into this great Northwest by rail, at ruinous rates. The products of the farms must pay ruinous rates to get to market. From Sioux City, Omaha, St. Joseph, and Kansas City many train-loads of meat-products are shipped daily. There are 80,000 barrels of flour ready to go south on the Mississippi every day from Minneapolis. Neither this commerce nor that of the Missouri will follow the rivers until the rivers are made fit to carry it. The railways build new lines knowing that trade will come to them. We must apply to our treat-

ment of the streams a little of the horse-sense that other nations use as to theirs, and that the railways put into their business. The old rule that a stream cannot be made fit for commerce until it has a commerce is a foolish one, and must be abandoned."

As a source of power water is wasted day in and out to the extent of millions of horse power and to the value of hundreds of millions of dollars, by not being used at all. For example, when the national Government builds dams for navigation on streams, it has often disregarded the possible use of water, for power, that flows over those dams. Since a fair price for power, where it is in demand, is from $20 to $80 per horse power annually, so Gifford Pinchot explains in the "Farmers' Bulletin", 327: "It will be seen that the Government has here developed, yet lying idle, a resource capable, under the right conditions, of adding enormously to the national wealth. So also in developing the western streams for irrigation, in many places irrigation and power might be made to go hand in hand."

IV

THE WASTE OF SOIL

The wrath of abused Nature reveals itself in many directions.

The destruction of the forests about the sources of our creeks, streams and rivers causes, together with the improper cultivation of these sloping lands, other great disadvantages to our country; the loss of enormous quantities of fertile soil, which are washed away from the mountains and fields, where they are needed, and are deposited where they do great and lasting mischief. The wash from one acre is often made the waste-cover for another acre, or for several.

The amount of soil, thus carried away, is calculated at more than a billion tons every year. The Mississippi alone sweeps into its lower reaches and the Gulf of Mexico 400,000,000 tons of floating sediment annually, about twice the amount of material to be excavated in opening the Panama Canal.

These vast loads not only pollute the waters, but cause their channels to clog and flood the lowlands, render the flow capricious and difficult to control, necessitate frequent and costly dredging and reduce the efficiency of works designed to facilitate navigation and afford protection from flood.

The government is called upon from time to time to contribute liberally for the relief of those who are suffering from the overflow of the great rivers of the West, and to expend millions in building embankments for the purpose of restraining the angry waters which come pouring down from the Rocky Mountains on the one side

Bank of Sand Deposited over Alluvial Bottom by Spring Floods, North Carolina

This rich land is rendered entirely useless by the sterile sand washed down over it from the denuded hillsides above

and from the Alleghanies on the other. It is only with great difficulty that these embankments are maintained, and from time to time they are burst asunder by the flood and have to be rebuilt.

To estimate the direct and indirect losses from such sources, the expenditures for building levees, for dredging the channels and harbours, is impossible; but they must be exceedingly large.

Together with the heavy loss of fertile soil goes a loss of enormous but unmeasured amounts of salts and other fertilizing elements, which are carried away in solution. Add to this that the American farmer never cared to replace that loss by manure, but was always anxious to extract from the soil as much as possible, and you have the explanation why so many American farms become exhausted and deserted. "Raubbau," they call in Germany this method of farming, which in the course of time results in the utter decline of good land, that under proper cultivation would have provided rich crops for centuries.

This ruinous process of soil exhaustion has already affected many of our States very seriously. North Carolina was, a century ago, one of the great agricultural States of the country, and one of the wealthiest. Today, as you ride through the South, you see everywhere land gullied by torrential rains, red and yellow clay banks exposed where once were fertile fields; and agriculture reduced because its main support has been washed away. Millions of acres, in places to the extent of one-tenth of the entire arable area, have been so injured that no industry and no care can restore them.

One of our best experts in land affairs, Mr. James Hill, said at the Governors' Conference, that the process

of soil exhaustion is creeping over the land from East to West.

"The abandoned farms that are now the playthings of the city's rich or the game preserves of patrons of sport, bear witness to the melancholy change. New Hampshire, Vermont, northern New York, show long lists of them. In western Massachusetts, which once supported a flourishing agriculture, farm properties are now for sale for half the cost of the improvements. Professor Carver, of Harvard, has declared, after a personal examination of the country, that 'agriculture as an independent industry, able in itself to support a community, does not exist in the hilly parts of New England.'

"The same process of deterioration is affecting the farm lands of western New York, Ohio and Indiana. Where prices of farms should rise by increase of population, in many places they are falling. Between 1880 and 1900 the land values of Ohio shrank $60,000,000. Official investigation of two counties in central New York disclosed a condition of agricultural decay. In one land was for sale for about the cost of improvements, and 150 vacant houses were counted in a limited area. In the other the population, in 1905, was nearly 4,000 less than in 1855.

"Practically identical soil conditions exist in Maryland and Virginia, where lands sell at from $10 to $30 an acre. In a hearing before an Industrial Commission, the chief of the Bureau of Soils of the Department of Agriculture said: 'One of the most important causes of deterioration, and I think I should put this first of all, is the method and system of agriculture that prevails throughout these States. Unquestionably the soil has been abused.' The richest region of the West is no more exempt than New

England or the South. The soil of the West is being reduced in agricultural potency by exactly the same processes which have driven the farmer of the East, with all his advantage of nearness to markets, from the field.

"Within the last forty years a great part of the richest land in the country has been brought under cultivation. We should, therefore, in the same time, have raised proportionately the yield of our principal crops per acre; because the yield of old lands, if properly treated, tends to increase rather than diminish. The year 1906 was one of large crops and can scarcely be taken as a standard. We produced, for example, more corn that year than had ever been grown in the United States in a single year before. But the average yield per acre was less than it was in 1872. We are barely keeping the acre product stationary. The average wheat crop of the country now ranges from 12.5, in ordinary years, to 15 bushels per acre in the best seasons. And so it is all down the line.

"But the fact of soil waste becomes startlingly evident when we examine the record of some States where single cropping and other agricultural abuses have been prevalent. Take the case of wheat, the mainstay of single-crop abuse. Many of us can remember when New York was the greatest wheat-producing State of the Union. The average yield of wheat per acre in New York for the last ten years was about 18 bushels. For the first five years of that ten-year period it was 18.4 bushels, and for the last five 17.5 bushels. In the farther West, Kansas takes high rank as a wheat producer. Its average yield per acre for the last ten years was 14.16 bushels. For the first five years it was 15.14 and for the last five 13.18. Up in the Northwest, Minnesota wheat has made a name all over the world. Her average yield per acre for the

same ten years was 12.96 bushels. For the first five years it was 13.12 and for the last five 12.8. We perceive here the working of a uniform law, independent of location, soil or climate. It is the law of a diminishing return due to soil destruction. Apply this to the country at large, and it reduces agriculture to the condition of a bank whose depositors are steadily drawing out more money than they put in.

"What is true in this instance is true of our agriculture as a whole. In no other important country in the world, with the exception of Russia, is the industry that must be the foundation of every State at so low an ebb as in our own. According to the last census the average annual product per acre of the farms of the whole United States was worth $11.38. It is little more than a respectable rental in communities where the soil is properly cared for and made to give a reasonable return for cultivation. There were but two States in the Union whose total value of farm products was over $30 per acre of improved land. The great State of Illinois gave but $13.48, and Minnesota showed only $8.74. No discrimination attaches to these figures, where all are so much at fault. Nature has given to us the most valuable possession ever committed to man. It can never be duplicated, because there is none like it upon the face of the earth. And we are racking and impoverishing it exactly as we are felling the forests and rifling the mines. Our soil, once the envy of every other country, the attraction which draws millions of immigrants across the seas, gave an average yield for the whole United States during the ten years beginning with 1896, of 13.5 bushels of wheat per acre. Austria and Hungary each produced over 17 bushels per acre, France 19.8, Germany 27.6 and the United Kingdom

32.2 bushels per acre. For the same decade our average yield of oats was less than 30 bushels, while Germany produced 46 and Great Britain 42. For barley the figures are 25 against 33 and 34.6; for rye 15.4 against 24 for Germany and 26 for Ireland. In the United Kingdom, Belgium, the Netherlands and Denmark a yield of more than 30 bushels of wheat per acre has been the average for the past five years.

"Our agricultural lands have been abused in two practical ways; first by single cropping, and second by neglecting fertilization. It is fortunate for us that nature is slow to anger, and that we may arrest the consequence of this ruinous policy before it is too late. In all parts of the United States the system of tillage has been to select the crop which would bring in the most money at the current market rate, to plant that year after year, and to move on to virgin fields, as soon as the old farm rebelled by lowering the quality and quantity of its return. It is still the practice; although diversification of industry and the rotation of crops have been urged for nearly a century and are to-day taught in every agricultural college in this country."

In the western regions many miles of once splendid grazing lands are fast being destroyed by another serious form of soil waste, through over-grazing and over-stocking the ranges. This unwise and indiscriminate use and abuse has resulted in the trampling out and practical extinction of many of the native forage plants. In California the pine lands, especially those of the northern part, suffered greatly before the establishment of the forest reserve policy, from the depredations of sheep and cattle. It is the custom of the shepherds to drive their flocks into the mountains every Spring. The pasturage

being free and unrestricted, the sheep were driven in in such numbers that they cropped the grasses to their very roots long before they went to seed, and stamped the roots into dust.

They also browsed upon and destroyed the seedling trees. Cattle, put upon the land in too great numbers, also added their destructive force to that of the sheep; so that a country over which these four-footed immigrants had run was left bare of low-lying cover and was trodden into dust. It was also the annual custom of the shepherds to fire whatever dry herbage their flocks had left undestroyed, thinking thereby to make better pasturage the next season. These fires, getting into the brush and attacking the easily inflammable timber, annually destroyed thousands of acres of fine trees and left the ground not only entirely bare, but also fire-baked and unable to reseed and recover itself. Between the sharp teeth and sharper hoofs of the sheep and the fires set by their shepherds, the Sierra forests of northern California were in a fair way of being quickly exterminated.

This destruction of vegetation and soil was accompanied by corresponding deterioration of water supply; and by a serious decrease in the quality and weight of animals grown on such overgrazed lands.

These sources of loss from failure to conserve the range are felt to-day. They are accompanied by the certainty of a future loss not less important, for range lands once badly overgrazed can be restored to their former value but slowly or not at all.

The waste of soil is, as can be seen clearly, one of the most dangerous of all wastes now in progress in the United States. Its very existence proves that the American people, wasteful and extravagant, has neither under-

Hillside Erosion in Abandoned Fields, North Carolina

stood nor comprehended the lesson taught by many other countries, as Spain, Greece, Asia Minor, Palestine and China, where there are large tracts almost absolutely bare of soil, on which stand ruins that indicate former flourishing conditions.

V

THE WASTE OF OUR MINERAL RESOURCES

When we see individuals or nations squander their fortunes and resources in one direction, we hardly expect that they are more thoughtful and economical in other directions.

To this rule Americans make no exception. It needs only a glance on the geological maps and reports of the United States to convince us that bountiful nature has endowed our country not only with a surprising variety of minerals, but distributed them in enormous quantities in the most accessible regions. In coal and iron, the most valuable of all minerals, the United States are richer than any other land on earth. There are three very large coal regions and many smaller ones. The most important region extends along the Appalachian highlands. The second begins not far from Lake Michigan and reaches beyond the Ohio and Mississippi Rivers. The third is around the lower Missouri.

Of iron four principal regions exist. The most productive is near Lake Superior; the others are in the Alleghenies, and Adirondacks and in Alabama.

Petroleum and natural gas occur in unmeasurable quantities in Pennsylvania, Ohio, West Virginia, Indiana, New York, Colorado and California. Most valuable copper mines are in Michigan, Montana, and Arizona. Lead and zinc are obtained in Missouri, Kansas and Wisconsin. Our great West abounds with gold and silver, while various kinds of building stone, as granite, marble, limestone, sandstone and slate are quarried mainly in

the eastern States, where, in the thickly settled portions of the country, these stones are most needed.

Did our nation make proper use of these vast treasures? Or have we depleted these priceless heritages in the same reckless manner as we destroyed the beautiful forests?

The answer must bring a blush of shame to every patriotic American, as the history of mining in the United States reveals another shocking picture of a mad rush for spoil and gain, of dire waste and destruction.

In an article, headed by the question: "How long will our coal supply last?" John L. Cochrane from the U. S. Geological Survey says: "Up to this time we have used the fuel resources of our vast country with the same reckless prodigality as the spendthrift son of a millionaire hurls his inherited dollars at the phantom he calls pleasure, with no thought of to-morrow, no thought of those who are to come after us. The possibility of exhaustion of the fuel supply perhaps never entered our minds, and if it did we dismissed it with the optimistic remark that the American people are ingenious and inventive, and when the coal is exhausted we will draw heat from the sun or some other source. With the most phenomenal growth and prosperity ever witnessed in any country; with the mills and factories running night and day, their products going to the uttermost parts of the earth; our thoughts were far from the serious problem of fuel supply as it relates to the future. The manufacturer saw his bin bursting with coal, his high smokestacks belching forth volumes of black smoke, and he was happy in the thought that more smoke meant more business and more money. He lost sight of the fact that this smoke was an evidence of waste, as well as an expensive nuisance in our larger cities. His imagination perhaps pictured only the mighty

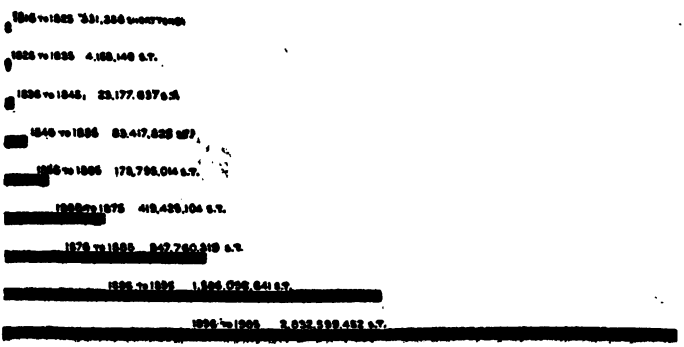
army of sturdy toilers delving ruthlessly into the earth and bringing forth an endless stream of black diamonds; but it rarely or never occured to him that there was a limit to the supply."

"Is there a possibility of exhausting the American coal mines?" So many may ask, who learned from their school books that the coal fields of America cover an area of 400,000 square miles and are, in fact, the richest of the world.

Let us see.

According to careful investigations and estimates, made by the United States Geological Survey, the total amount of coal in the United States, exclusive of Alaska, is approximately 2,000,000,000,000 short-tons (one short-ton of coal equals 2000 pounds). If moulded into a single block, this mass would form a cube seven and one half miles each side. It would tower high above the highest mountain on the globe. Such a majestic amount of coal seems inexhaustible. But when the Geological Survey experts reviewed the consumption of coal in the United States by decades, they found the rate of increase so enormous, that if it goes on, the coalbeds will be practically exhausted within 100 years.

The consumption of coal by decades was as follows:



As these figures show, the amount of coal used in any one decade is equal to the entire previous production, and the aggregate consumption of the ten years from 1905 to 1915 will probably approximate to the aggregate of consumption during the preceding eighty-five years.

Such a rate, if continued, means an increased production, that no supply, however great, can withstand. Alarmed by this situation, the Geological Survey took great pains to investigate the methods of mining in the United States.

It was found that these methods are wasteful in the extreme, as from 40 to 70 per cent of the total deposits are left unmined underground. In many cases only the best parts of the coal from the beds is removed, while inferior qualities, and such portions as can be less easily mined, are never touched. Very frequently the lowest, richest beds of coal are taken out first, in consequence of which the overlying strata cave in, which makes subsequent mining forever impossible.

The great losses to the nation from this form of waste are so much more inexcusable, as they can be prevented by the appliance of the flushing method, an American invention, by which worked-out mines are filled up with sand, sludge, tailings and slack.

These materials, mixed with water, are pumped through pipes into the exhausted places, where they harden into a compact mass, which supports the overlying strata and prevents their caving in. By this method the miner is able to remove all pillars of coal, which formerly he was obliged to let stand as support for the upper strata. Also he may attack lower beds of coal without fear of being killed.

Germany, wishing to make the use of its mines as ex-

tensive as possible and to preserve the prosperity of mining for the future, has adopted this flushing method everywhere, while the Americans in their eagerness to get rich quickly, make only a limited use of their own invention.

Andrew Carnegie, who ought to know, gave before the Governors' Conference some interesting facts about the waste in American mines. He explained that the methods of mining during the period from 1820 to 1895 had been so wasteful, that while 4,000,000 tons of coal were actually mined, some 6,000,000 tons were either destroyed or allowed to remain in the ground beyond reach of future use. During the ten years from 1896 to 1906 as much was produced as during the preceding seventy-five years; while more than 3,000,000,000 tons were destroyed or left under ground. Up to date the actual consumption of coal has been over 7,500,000,000 tons; the waste and destruction in the neighbourhood of 9,000,000,000 tons.

An extravagance still more wasteful than in the mining methods, has been established by the Fuel-testing division of the United States Geological Survey, in our methods of consuming coal. It was found that usually only from 5 to 7 per cent of the energy of coal is converted into actual work. The remaining 93 to 95 per cent is consumed in the making of steam and smoke, and in overcoming the friction and inertia of the engine, shafting, etc. Of the coal used in railroad operations—which comprises about 100,000,000 tons or nearly one-fourth of the total output of the country—not more than 5 per cent is transformed into the actual work of pulling the trains.

"The magnitude of this problem," said Dr. Joseph A. Holmes, chief of the Technological branch of the U.S. Geological Survey, "and its relation to the transportation

problems of this country, may be realized when we remember that a great railway system like the Pennsylvania must haul 40,000 tons of coal each day, or nearly 15,000,000 tons a year, for use as fuel on its locomotives.

"A similar waste confronts us at every phase of inquiry. From our steel furnaces gas escapes into the atmosphere equivalent to more than 2,000,000 horse power. From our coke-ovens we waste into the atmosphere burning gas, the equivalent of enormous power; nitrogen enough for fertilizers of a value of many millions of dollars; to say nothing about other valuable by-products. This waste is appalling, and every possible means should be adopted for reducing it to a minimum, in order that our fuel resources may suffice for the future as well as for the present needs of the nation."

Of all the world's metals, iron is the most useful. Together with coal it is the foundation of America's industrial prosperity. The present amount of iron ore in the United States is estimated at 10,000,000,000 tons. The total production of iron in the United States from the beginning of mining up to 1890 was about 275,000,000 tons. In the ten years 1890 to 1900, 200,000,000 were produced and in the seven years 1900 to 1907 more than 270,000,000 tons.

Andrew Carnegie believes that at that present rate of increase—doubling each decade—the consumption in 1918 will exceed 100,000,000 tons; by 1928, 200,000,000 and by 1938 over 400,000,000 tons annually. "By that date," he said, "which many of us expect to see, about half the original supply of iron will be gone, and only the lower grades of ore will remain, and all the ore now deemed workable will be used long before the end of the present century."

Many fields of iron, among them the famous Iron

Mountain in Missouri, which forty years ago was declared, even by experts, to be inexhaustible, have already been abandoned, as the entire deposit of iron ore is exhausted. In others only the higher grades have been taken from the mines, leaving the least valuable beds to be exploited at increased cost or not at all.

How large the original beds of copper, zinc, lead, silver, and other ores are in the United States, nobody knows. Miners and operators believe the supply unlimited, just as a generation ago they thought iron inexhaustible. All we know at present for sure is the fact that many mines and districts have been exhausted, or that the depth of the mines has so increased as to raise the cost to a prohibitory figure and to compel abandonment. The current and avoidable waste in metal mining and reducing these ores is estimated by experts to average 30 per cent. The waste was under old time practices far greater than now, as the Americans only followed the "pay streak," and that part of the "pay streak" which paid the best. The lower grade ores were either thrown away on the dump, or left underground, under conditions that made their future removal so difficult and expensive as to be almost or quite beyond reach.

While in mining, by adopting improved modern methods, the waste has been diminished, it continues in the milling and treatment of the ores and averages in general not less than 50 per cent of the possible product.

Unmeasurable quantities of petroleum have been wasted in former times by overflows as well as by the ruinous practice of "shooting" the oil wells. This method for increasing the flow was devised in 1862 by Colonel E. A. L. Roberts. The operation was simple enough. The charge consisted of a large quantity of

Courtesy of the Frank A Munsey Company

When an oil well is torpedoed, nitroglycerin is exploded in the shaft to increase the flow, and the explosion sends up a fountain of oil and fragments of rock

nitroglycerin which was lowered into the well in canisters about 10 feet long and 5 inches in diameter, the bottom of each being made conical so that it would fit snugly into the top of the one next below it. On the top of the uppermost section came a cap or exploding device. Everything being in readiness, the operator dropped into the well a twenty pound piece of iron, called the "go devil," and at once went for a place of safety from which to watch results. As most of the wells are about 2,000 feet deep, no report of the explosion was perceptible, but after a few minutes, a gurgling liquid was heard rushing up to the surface, and then, with a grand burst an enormous column of oil and gas was thrown into the air, accompanied by showers of bits of rock and pieces of the canisters. Nothing was done to stop the first rush of oil from the well, and hundreds of barrels were lost at every shot.

Though the practice of "shooting a well" has yielded large returns in many instances, the best authorities now agree that it is destructive and wasteful, and its benefits to the region in general very doubtful. In fact, many of the oil wells, which in former days furnished from 1,000 to 20,000 barrels per day, have given out and are exhausted.

In the early days of petroleum great quantities were allowed to run into the streams. Cases are known in which vast amounts of oil were systematically burned in order to get rid of it. There was also an enormous waste through the failure to save the gasoline, naphtha, vaseline and other by-products, which now have great value. To prolong the life of the oil supplies of the U. S., the Geological Survey hopes that future investigations and discoveries may develop new methods and processes of yet greater efficiency, by which the life of the oil supplies of the United States might be prolonged.

Waste, sheerest waste, also ended the life of numerous wells of natural gas in Ohio, Pennsylvania, Indiana, West Virginia, and other States. Natural gas is the product of the decomposition of organic remains, vegetable or animal, buried æons ago in the rock layers. Its intense heating power, the ease with which it is handled, its freedom from sulphur and odour, its total lack of smoke and cinders, and the uniformity with which heat may be regulated by its employment, make it superior to all other fuels.

Although it became known to the first discoverers of petroleum, it was not used for many years, but allowed to escape. In many places, where it gushed through openings in the surface of the earth, it had been lighted by the people and burned night and day for years.

When twenty-five years ago I happened to visit western Pennsylvania, I met in the vicinity of Murraysville near Pittsburg, a marvellous sight: an enormous flambeau, which rose high above all buildings and forests and lighted the country for many miles around. Coming near this blazing flame I heard a deafening hiss, caused by the invisible stream of gas rushing from the mouth of the earth. It shot for about 20 feet into the air, then transformed itself into an immense column of fire, which, torn by the winds, floated hither and thither and divided into thousands of blue tongues, which like so many snakes shot out in all directions.

When I asked about the origin of this remarkable phenomenon, the people of Murraysville informed me that in 1880 some men, while boring for petroleum, struck a subterranean cave filled with natural gas. Being released it rushed to the surface with such tremendous force that the drilling engine, weighing more than 3,000 pounds, was thrown high into the air and

shattered. The report of the explosion could be heard for several miles and started almost a panic. It took some time before people ventured to go near this hissing caldron. Then came a day when someone threw a burning stick into the rushing gas, which at once turned into a mighty flame. Nobody cared to extinguish it again, and so it burned for more than five years. The amount of gas, which here went to waste, would be worth at current prices many million dollars.

Hundreds and hundreds of such burning wells could be seen in the oil districts. Many were carelessly set on fire and burned for months and years, without any attempt being made to extinguish them. Other wells were purposely lighted, to be advertised as remarkable pyrotechnical displays which might attract visitors to the gas regions. And still more were not put to any use at all, as it seemed to the coal barons not advisable to have the price of coal cheapened by the introduction of a new fuel, although it had superior qualities.

In those days the traveller could see almost anywhere, where natural gas was used for heating and lighting purposes, the pipes and burners used to light village streets blazing away all day, it not being worth while to turn them off, as they would have to be lighted again the next night.

In these and many other ways the gas was wantonly and extravagantly wasted, in quantities far beyond computation. And this enormous waste goes on, though the great fuel value of the natural gas has been established for several decades.

In his able paper "The waste of our fuel resources," Dr. I. C. White, State Geologist of West Virginia, made before the conference of Governors the following sensa-

tional statement: "The wildest anarchists determined to destroy and overturn the foundations of government could not act in a more irrational and thoughtless manner than have our people in permitting such fearful destruction of the very sources of our power and greatness. Let me enumerate some of the details of this awful waste of our fuel resources, that has been going on with ever increasing speed for the last fifty years.

"First let us consider how we have wasted natural gas, the purest form of fuel, ideal in every respect, self-transporting, only awaiting the turning of a key to deliver to our homes and factories heat and light and power. Partial nature has apparently denied this great boon to many other lands. It is practically unknown in France, Germany and Great Britain, our chief competitors in the world of industry. Even wood and coal must first be converted into gas before they will burn, but here is a fuel of which nature has given us a practical monopoly, lavish in abundance, already transmuted into the gaseous stage and stored under vast pressure to be released wherever wanted at our bidding. The record of waste of this our best and purest fuel is a national disgrace. At this very minute this unrivalled fuel is passing into the air within our domain from uncontrolled gas wells, from oil wells, from giant flambeaus, from leaking pipe lines and the many other methods of waste at the rate of not less than 1,000,000,000 cubic feet daily and probably much more.

"Very few appear to realize either the great importance of this hydro-carbon fuel resource of our country or its vast original quantity. Some of the individual wells, if we may credit the measurements, have produced this fuel at the rate of 70,000,000 cubic feet daily, the equivalent

in heating value of 70,000 bushels of coal, or nearly 12,000 barrels of oil, In my humble opinion the original amount of this volatile fuel in the United States, permeating as it does every undisturbed geologic formation from the oldest to the most recent, rivalled or even exceeded in heating value, all our wondrous stores of coal.

"Suppose that it were possible for some Nero, inspired by a mania of incendiarism, to apply a consuming torch to every bed of coal that crops to the surface from the Atlantic to the Pacific, and that the entire coal supply of the Union was threatened with destruction within a very few years, what do you think would happen? Would our State Legislatures sit undisturbed, panoplied by such a carnival of fire? Would the Governors of 30 States remain silent while the demon of flame was ravaging the coal resources of the Republic? Certainly not. There would be a united effort by the Governors and Legislatures of all the States in the Union to stay the progress of such a direful conflagration; even the sacred constitutional barriers wisely erected between State and Federal authority would melt away in the presence of such an awful calamity, and the mighty arm of the nation would be invoked to end the common peril to every interest. And yet this imaginary case is an actual one with the best and purest fuel of the country, equal probably in quantity and value for heat, light and power to all our coal resources. This blazing zone of destruction extends in a broad band from the Lakes to the Gulf, and westward to the Pacific, embracing in its flaming pathway the most precious fuel possessions of a continent. No one can even approximately measure the extent of this waste. From personal knowledge of conditions which exist in every oil and gas field, I am sure the quantity will amount

to not less than 1,000,000,000 cubic feet daily, and it may be much more. The heating value of a billion cubic feet of natural gas is roughly equivalent to that of 1,000,000 bushels of coal. What an appalling record to transmit to posterity!

"From one well in eastern Kentucky there poured a stream of gas for a period of twenty years without any attempt to shut it in or utilize it, the output of which, it has been figured, was worth at current prices more than $3,000,000. Practically the same conditions characterized the first twenty-five years of Pennsylvania's oil and gas history, and the quantity of wasted gas from thousands of oil and gas wells in western Pennsylvania is beyond computation. In my own State of West Virginia, only eight years ago, not less than 500,000,000 cubic feet of this precious gas was daily escaping into the air from two counties alone, practically all of which was easily preventable, by a moderate expenditure for additional casing. When it is remembered that 1,000 cubic feet of natural gas weighs 48 pounds, and that 6,000 cubic feet of it would yield a 42-gallon barrel of oil when condensed, so that a well flowing 6,000,000 feet of gas is pouring into the air daily the equivalent of 1,000 barrels of oil, what would our petroleum kings think, if they could see this river of oil (for the equivalent of a billion feet of gas is more than 160,000 barrels of petroleum, and of practically the same chemical composition as benzine, or gasoline) rushing unhindered to the sea? Would they not spend millions to check such a frightful waste of this golden fluid? And would they not be the first to appeal to the national government for aid in ending such great destruction of property? And yet because natural gas is invisible, and its waste is not so apparent to the eye as a

stream of oil, or a burning coal mine, the agents of these oil magnates have not only permitted this destruction of the nation's fuel resources to continue, but they have prevented by every means in their power the enactment of any legislation to stop this frightful loss of the best and purest fuel that nature has given to man! There can be no doubt that for every barrel of oil taken from the earth there have been wasted more than ten times its equivalent in either heating power, or weight even, of this best of all the fuels, and also that much more than half of this frightful waste could have been avoided by proper care in oil production and slight additional expenditures.

"In justice to the great oil-producing corporations, it must be acknowledged that they have not permitted much waste of petroleum except what has been sprayed into the air by their waste of gas, and also that their handling of petroleum has been from the beginning a model of business economy and management. The great mistake of the oil producing interests has been in not properly apprehending the enormous fuel value of the natural gas they were destroying, and in not demanding legislation for its protection instead of successfully throttling and preventing it in every State of the Union except one—Indiana. When the people of that great State awoke to the fact that their richest mineral possession was being rapidly wasted, they rose to the occasion, and although it was largely a case of 'locking the stable door after the horse had been stolen,' they effectually prevented any further useless waste of natural gas. This Indiana statute, which has been declared constitutional by our highest courts, says in effect to the oil producers: 'You cannot take the oil from the ground where nature has safely stored it, until you provide a method of utilizing the accompanying gas, or vola-

tile oil as well,' and it also says to both the producer and consumer of natural gas that it is against 'public policy to waste this valuable fuel and that it will not be permitted to either party.' This Indiana statute for the conservation of petroleum and natural gas should be enacted into law in every State where this precious fuel exists; and why has it not been done? Let the answer be found in the history of my State, where the waste of natural gas has been exceeded only by that of our sister State of Pennsylvania.

"For ten years your speaker has appealed in his official capacity as State Geologist to the Legislature of West Virginia to put some check upon this frightful waste of our State's most valuable resource. Three patriotic Governors, including our present able executive, Governor Dawson, have in every biennial message besought the Legislative branch to end this criminal destruction by appropriate legislation, but some unseen power greater than Governors or Legislatures has so far thwarted and palsied every effort to save the State and the Nation this priceless heritage of fuel, so that although five successive Legislatures have attempted to deal with the question in biennial sessions, not an effective line has yet been added to the statutes, and at this very hour not less than 250,000,000 cubic feet of gas, and possibly more than double that quantity, is daily being wasted in this one State alone, 80 per cent of which is easily and cheaply preventable.

"Why should a few oil producers, in their insane haste to get rich quickly, or add to fortunes already swollen beyond safety to the Republic, be permitted thus to despoil the entire country of its choicest fuel?"

In former days it was believed by many that the supply of natural gas was inexhaustible, and that its formation

in the bowels of the earth would proceed as fast as man could use it up. But the exhaustion of one well after another, and the diminution in the pressure of gas in others served as distinct warnings that must be heeded. The supply is undoubtedly on the wane.

In Indiana not only the quantity of natural gas produced within the State has steadily decreased since the year 1902, but also the pressure has fallen from 325 to 190 pounds. In many wells pumps must be used to keep up the desired supply. All official reports of 1906 and 1907 indicate that the wells in Indiana are rapidly being exhausted. In some parts of Ohio the pressure declined from 450 pounds to the square inch in 1888 to 36 pounds in 1897, this causing the abandonment of many wells.

Eminent scholars have pointed to the fact, that while some of the natural resources of our land renew themselves or can be replaced by toilsome work and at great cost, our mineral resources, when once exhausted, are exhausted permanently. What nature produced in the course of millions of years, man cannot reproduce. Once gone, it is gone forever. For this reason the waste of our mineral resources is a most serious matter, which affects the welfare and future of the whole nation and therefore should find the close attention of everyone concerned.

VI

THE EXTERMINATION OF OUR GAME, FUR, AND GREAT MARINE ANIMALS

Since the days of its discovery to the middle of the 19th century North America was of all continents the richest in animal life. Especially that part now called the United States was tracked by countless numbers of living beings, such as elk, deer, moose, bison, antelopes, wild sheep, goats, birds and fishes of all kinds. So enormous were their numbers, that it was, in fact, impossible for the American aborigines to materially diminish them, though the redskins almost entirely depended upon the flesh of those animals for food.

The 19th century has changed these conditions radically. The bountifulness once showered by nature upon our country has been wasted and destroyed in the most reckless manner by the white market and skin hunters, by the "game hog" and would-be-sportsmen, who, without reverence for life, had no other object than to satisfy their avarice and their insatiable craving to kill. These selfish savages, the scum of civilization, wanted to exterminate all the game and to leave as little as possible for those who would come after them. How thoroughly they did their work is well known. Robbed of its rich fauna, which once supported millions of people and was the source of fabulous wealth, America is fast becoming the continent poorest in animal life. The enormous destruction wrought to the fauna of North America became most apparent with creatures which kept together in large herds or flocks, like the bison or buffalo, the elk, the seal, the passenger pigeon, the heron, and the salmon.

The account of the extermination of these animals must grieve the heart of every American and will, for all ages to come, remain a black stain upon the pages of our history.

To give an idea of the amount of destruction wrought among them it will be necessary to give the story of several animal tribes somewhat more in detail.

Like wild inventions of fiction appear the authentic reports of travellers and trappers, who only forty years ago, while crossing the great plains of the far west, met buffaloes in such multitudes that the plains appeared literally black with them as far as the eye would reach. And frequently, trains of the Union Pacific Railroad were derailed in attempting to pass through herds of buffalo, until the engineers learned it was advisable to bring their engines to a standstill when they found the line blocked in this manner.

Frederick Seymour, the well-known naturalist, states that when he was on the Arkansas River in 1867 the whole country appeared one great mass of buffalo moving slowly to the northward, and that a train of the Kansas Pacific Railroad once passed through a herd for a distance of 120 miles.

If we ask why not a single bison is met with to-day on the plains, and what became of those multitudes, we receive the answer: "Destroyed! exterminated!" Yes, the bison disappeared, like the redskin, who found no longer a homestead upon that soil, once belonging to him. While the pale-face forced the Indian farther and farther back, he also exterminated the buffalo.

It is a historical fact that at the time of the discovery of America the buffalo roamed over almost the entire continent. Its range reached from western Pennsylvania,

New York, Virginia, and the Carolinas as far west as Oregon and Nevada and from the Great Slave Lake in British North America well into Mexico.

The Europeans, who met the buffalo first, were utterly at a loss to give to their countrymen at home an idea of the incredible numbers of buffaloes they had seen. To impress them with the immensity of the herds they invariably used superlatives: "Millions upon millions!" "Countless myriads!" "Untold legions!"—

There is no question that of all the quadrupeds that ever trod the earth no other species has marshalled such enormous hosts as the American bison or buffalo. One might as well attempt to count the stars in the skies or the leaves in the forest. It is stated that at the time of Columbus their number was not less than 150,000,000 heads. Whatever the correct number may have been, it is a fact that up to the beginning of the 19th century it had decreased to about 40,000,000. At that time the buffalo was still hunted in Kentucky and Illinois. A few decades later the bison had retreated to the plains west of the Missouri. But also in this region he was defeated. First its habitat became divided in two by the "California overland immigration," which followed the Kansas and Platte Rivers and passed through the centre of the buffalo region. Travelling always in large numbers, these immigrants killed hundreds of thousands of buffaloes. In time these animals learned the dangers of that road and kept away from it by dividing into two groups, the one several miles north, and the other some miles south of the road. The southern herds were annihilated when the Kansas Pacific and the Atchison, Topeka and Santa Fé Railroad began to penetrate its range. These lines soon swarmed with men, each excited with

the prospect of having a buffalo hunt that would pay, since buffalo hides were marketable and would sell for a goodly sum.

One of the best authorities, Richard I. Dodge, Lieutenant-Colonel U. S. A., who, at that time, was stationed at Fort Dodge on the Arkansas, described in his splendid book, "The Plains of the Great West," his own experiences of that time. "By wagon, on horseback, and a-foot, the pot-hunters poured in, and soon the unfortunate buffalo was without a moment's peace or rest. In the beginning of the hide business, the hunting parties organized themselves on any haphazard basis. Every man wanted to shoot, no man wanted to do the other work. Buffalo were slaughtered without sense or discretion, and often left to rot with the hides on. Though hundreds of thousands of skins were sent to market, they scarcely indicated the slaughter. From want of skill in shooting and want of knowledge in preserving the hides of those slain, on the part of these green hunters, one hide sent to market represented three, four, or even five dead buffalo.

"The merchants of the small towns along the railroads were not slow to take advantage of this new opening. They furnished outfits, arms, ammunition, etc, to needy parties, and established great trades, by which many now ride in their carriages.

"The buffalo melted away like snow before a summer's sun. Congress talked of interfering, but only talked. Winter and summer, in season and out of season, the slaughter went on.

"The fall of 1873 saw an immense accession of hunters; but by this time the local merchants, recognizing its importance, had got the trade pretty well into their own

hands. Most of the hunting parties were sent out by them, and were organized for even a greater destruction of buffalo.

"The most approved party consisted of four men, one shooter, two skinners, and one man to cook and to take care of camp. Where buffalo were very plentiful, the number of skinners was increased. A light wagon, drawn by two horses or mules, took the outfit into the wilderness, and brought into camp the skins taken each day.

"The supplies were generally furnished by the merchant, for whom the party was working; in addition, he paid each of the party a specified percentage of the value of the skins delivered. The shooter, who was the leader of the party, selected the best buffalo region known to him and then made ready for work.

"Early next morning, rifle in hand, and belt well supplied with ammunition, he sallied forth. His object was not only to kill, but to avoid frightening the living—keeping the wind, peeping over hills, creeping along ravines, now bagging a solitary victim, now screened by a bank, putting bullets into three or four before they could get away. Occasionally he found a herd in an exceptionally favourable position. Then he crawled unsuspected to within 30 or 40 feet of the nearest buffalo and sent a bullet into its heart. The animal made a plunge forward, walked a few steps, and stopped with the blood streaming from his nostrils. The other buffalo, startled at the report, rushed together, but, neither seeing nor smelling danger, stared in uneasy wonder. Attracted by the blood they collected about the wounded buffalo. Another bullet was sent in; another buffalo plunged, stopped, and bled. The others still stared, and, seeming to think the wounded animals responsible for the unusual noise,

concentrated their attention on them. Again and again the rifle cracked. Buffalo after buffalo bled, tottered, and fell. The survivors stared in imbecile amazement. When the shooter had killed or mortally wounded as many as his party could skin, he returned to camp. This method was called "getting a stand," and the number killed by the hunter, under such circumstances, was only limited by the number of animals in the herd, or capacity of the hunting party to skin. I have myself counted 112 carcasses inside a semicircle of 200 yards radius, all of which were killed by one man from the same spot, and in less than three quarters of an hour.

"The skinners with the wagon followed the shooter at a distance, whipped off the skins of the victims, and cut out the tongues. The loin, the ribs, the hump, all the best and most savoury parts of the animal, were left to rot, or eaten by wolves. In the very large majority of cases the whole carcass was left to rot where it fell.

"In the height of the furor of slaughter (1872-1873), when buffalo were so plentiful that skinning was the only work, the ordinary process was found to be much too slow for the 'great American buffalo skinner,' so he devised a plan of his own. An incision was made across the back of the head, just in front of the ears and around the throat. This thick skin, ears included, was started by skinning down some 6 or 8 inches. Connecting incisions were made from the throat down the belly, and from this down each leg to the knee as is usual. A stout rope was fastened about the thick skin on the back of the head, the ears preventing its slipping off when pulled. A strong iron spike about three feet long was then driven through the head of the buffalo into the ground, pinning it fast. The wagon was then brought up, and the other end of the rope

made fast to the hind axle. The horses were whipped up, and the skin torn from the carcass at one pull. I have seen a skin taken off in this way, in, I think, less than five minutes. Sometimes the skin was badly torn, and always more or less flesh adhered to it. When the careful preparation of each skin began to be of greater importance than time, this process was abandoned, and the skinner returned to his usual greasy, filthy, and legitimate work."

Dodge describes also the manner by which the hunter secured a prodigious amount of buffaloes. "The country south of the South Platte is without water for many miles, and the buffalo must satisfy their thirst at the river. Every approach of the herd to water was met by rifle bullets, and some buffalo bit the dust. Care was taken not to permit the others to drink, for then they would not return. Tortured with thirst, the poor brutes approached again and again, always to be met by bullets, always to lose some of their number. In places favorable to such action, a herd of buffalo has, by shooting at it by day, and by lighting fires and firing guns at night, been kept from water for four days, or until it had been entirely destroyed."

As in the very large majority of cases the whole carcasses of the slain buffalos were left to rot, where they fell, such slaughtering places presented a horrible aspect. In the fall of 1873, Colonel Dodge went with some gentlemen over the same ground they had traversed a year before. Where there were then myriads of buffalo, there were now myriads of carcasses. The air was foul with sickening stench, and the vast plain, which only a short twelvemonths before teemed with animal life, was a dead, solitary, putrid desert.

William Bickmore, an English traveller, writes; "During the autumn of 1873, while riding some 30 to 40 miles along the north bank of the Arkansas River, there was a continuous line of putrescent carcasses, so that the air was rendered pestilential and offensive to the last degree."

Colonel Dodge estimates the number of buffalo killed within the short space of the three years 1872, 1873, and 1874 at four and a half millions, out of which number upwards of three millions were killed for the mere sake of their hides.

When one reads of such destruction, it is at first almost impossible to realize what this slaughter represents, and how much good and nutritious animal food, which would have fed the red men as well as the hardy settlers of the Great West, has been wasted.

The citizens of the United States will better realize this great waste, if they consider, that this destruction amounted each year to more than double the annual drives of cattle from Texas, which range from 350,000 to 500,000 head; or that it would have been numerically the same if during the three years half the cattle of Texas or all the cattle in Canada had been carried off by some disease.

The mere loss of food, however, was not the only evil which resulted from this wanton wastefulness. Many of the wild Indians of the plains, deprived of their ordinary sustenance, and driven to desperation by starvation, killed the cattle of the settlers and caused thereby bloody wars, in which many lives were lost, the cost to the government being several millions of dollars.

Also the settlers and pioneers of the plains, who always looked to the buffalo for their winter supply of meat, had been deprived of this resource. In 1873, when the

settlers of Kansas suffered from the destruction of their crops by the grasshoppers, troops were considerately sent by the Government to provide meat for the starving families. When the soldiers arrived, however, there was but little meat for them to kill, as the "buffalo skinners" had slaughtered nearly every buffalo in this district.

The extinction of the southern range of buffalo was completed about the year 1875. The herds of the northern range lasted only a few years longer. As soon as the lines of the Northern Pacific reached Dakota and Montana, the same horrible slaughtering, as done in the south, was repeated. And the white barbarians were not satisfied till the last small herd of buffalo had been annihilated. The last cargo of buffalo hides was shipped to the East by the Northern Pacific Railroad in 1884. And the last buffalo hunt within the United States happened in 1886, when Wm. T. Hornaday, chief of the taxidermical department of the Smithsonian Institution at Washington, D. C., started an expedition to collect in Montana some robes and skeletons of buffalo, which might be used for arranging a group of buffalo, to be exhibited at the National Museum. Only after very tedious movements of several months Mr. Hornaday succeeded in bringing together 24 hides, and 16 skeletons, which he brought to our capital.

Of the 40,000,000 of buffalo, which at the beginning of the 19th century roamed over our continent, there remain to-day not more than about 1600, which are kept in the Yellowstone National Park, in the Zoological Gardens of America and Europe, and on the private grounds of a few rich men, who try to save this species from utter extinction.

That the extinction of buffalo meant the disappearance

of one of mother earth's most useful animals, will be understood when we point out the manifold uses it had found in the household of the American Indian. What the Coco palm means to the inhabitants of the tropics, the camel to the Bedouin of the desert, and the reindeer and seal to the Laplanders and the Eskimos, the buffalo was to the red man. Everything they needed, the buffalo gave them. Its flesh served as food. The robes provided not only the material for lodges, the most practical and warmest shelters ever devised, but they were also used as couches and winter coverings. The dressed hides furnished splendid shirts, leggings, moccasins and saddle covers. From the raw-hides the Indians made shields, quivers, parfleches or valises in envelope shape, knife-sheaths, lassoes, and even boats. The bones and shoulder-blades were made into breastplates as protection against arrowshots, and into saddles, hoes and axes. The ribs served as runners for small sledges drawn by dogs. The horns furnished spoons, ladles, powder-flasks and many other implements. The hoofs, when boiled, gave excellent glue, the sinews thread and bow-strings. Water-buckets were made from the lining of the paunch, fly-brushes from the skin of the tail dried on sticks. And the dried dung gave an excellent fuel. Little wonder then, that so useful an animal was held sacred by the Indians, and that they thought it was given to them by the Great Spirit.

That the extinction of the buffalo by the white people was a grave mistake, as this animal had a great commercial value, has been proved by experiments made during the last years. By crossing the buffalo with ordinary cattle it became possible to raise a new breed of animal, which combines all the good qualities of the cattle with

those of the buffalo. It is not only much more endurable than the ordinary cattle, but has also a much finer, softer and thicker robe than even the buffalo. The flesh resembles so much that of the cattle, that a difference is hardly noticeable.

Besides the buffalo, all other kinds of game in the territory of the United States have terribly suffered under the relentless persecutions of the white man. The moose, the largest of the deer family, once roamed from Canada throughout the whole of New England, and in New York as far south as the Catskill Mountains. To the early settlers of Vermont, New Hampshire and Maine, the meat of the moose was a most welcome means of sustenance: in fact, it alone enabled the first colonists to keep from starvation during the long winters. The Adirondacks were once a favourite resort of the moose, and it is said in that beautiful combination of mountains, forests and lakes, the moose exceeded the deer in number. But with the advent of the white hunter the moose vanished with astonishing rapidity.

The last known specimen in New York was shot in the fall of 1867. Moose have utterly vanished from Vermont and New Hampshire. In Michigan, Wisconsin and Minnesota they are almost extinct. In Maine, where annihilation was near, it has been preserved only by vigorous protection of the law. In Canada moose are still numerous, but are disappearing fast in spite of the nominal protection of the law. In the far north the destruction of moose is proceeding with almost incredible rapidity.

The elk or Wapiti, one of the most stately and largest of the deer tribe, ranged once from the Pacific eastward nearly to the Atlantic coast. Only thirty years ago it

was an inhabitant of Michigan and Iowa and was so abundant in the mountains of Wyoming, Idaho, Montana and Colorado, that thousands could be seen in a single day. As George Bird Grinnell states, from 1877 to 1883 they were so numerous in the bend of the Platte in Wyoming, that a man could have killed 100 or more in a single day. In December, 1901, herds of 3,000 to 8,000 head were seen in Montana.

During the last decades the elk was not only hunted for his skin, flesh and horns, but for his teeth, because these fetched high prices, as they were worn as amulets and ornaments by numerous members of the Order of the Elks. Now the elk is practically extinct east of the Rocky Mountains and confined to the high plateaus and mountains near the Yellowstone Park.

Naturalists believe that the eastern form probably differed considerably from the elk of the plains and the Rocky Mountains, but in which points and to what extent will never be known, owing to the entire absence from American museums of specimens from the eastern parts of the United States.

The antelopes or pronghorns, once roaming in large herds over all parts west of the Mississippi, have been swept off the plains and forced toward the mountains. They are practically extinct in Kansas, Nebraska, the Dakotas, Oklahoma and the Indian Territory. Unless strenuously protected, this most graceful and agile of all American game animals will soon wholly disappear from our western plains and mountains.

The bighorn or mountain sheep was formerly an inhabitant of the open country. Lewis and Clarke, Pike, Fremont and other explorers found it in large numbers on all plains and higher plateaus between the Missouri

and the Pacific. Now it has been exterminated in most of its ancient habitats and is at present to be found only on the most inaccessible mountains and rocks. In earlier days one of the gentlest and most unsuspicious of all western animals, it became through the constant pursuit of men, one of the shyest of all American game animals.

There are five different species of this animal. But its scarcity is best illustrated by the fact that the "American Museum of Natural History" at New York up to the year 1902 possessed only one pair of poorly mounted specimens. Efforts had been made to get material for the construction of a group of this striking species, but the expense and the difficulty of the undertaking have thus far compelled the museum authorities to postpone any attempt to prepare it.

The same sad story of fast-approaching extinction is true in regard of the White Mountain Goats. Once abundant in the Rocky Mountains, the Sierra Nevada and the Olympic Range, they have been followed by the hunter into their remotest and most secluded resorts. Exceedingly watchful and sagacious, they survive in comparatively very small numbers in greatly restricted areas. Their chief protection against complete destruction lies in the inaccessibility of their favourite haunts as well as in the worthlessness of their hides and flesh.

The caribou, which touches the United States at only a few points, chiefly in Maine, on the western slope of the Rocky Mountains and perhaps in Oregon, has like all other species of North American deer, as the White-tail, the Black-tail, the Mule-deer and others, suffered from the ravages of the skin-hunters.

The same is the case with the bear, the beaver, the sea-otter, the musk-rat and many other fur animals. At the

time of the discovery of America the beaver had among all mammals the widest distribution, except the puma or mountain lion. Its numbers ran up into millions, but the great demand for their valuable furs decreased their number in such a degree that at present these animals are found only in very few places, and on "beaver preserves," which have been established by the Hudson Bay Company.

The sea-otter belongs to these animals, whose passing away is a question of only a few years. At the beginning of the 19th century over 15,000 were killed every year near the Aleutian Islands. Now it appears here and there along the coasts and islands of Alaska, British Columbia and California, but is already so scarce and so difficult to obtain, that its coat, if in good condition, brings from $1000 up to $1500.

That the alligator belongs to the useful animals, has been found out in the southern States, since it has been almost exterminated. When it became known that the skins of these saurians could be used for boots, shoes, trunks, belts and pocketbooks, speculators went after them in hot haste, to kill all they could get hold of. In Florida alone 3,000,000 have been killed in the last twenty years—actually 150,000 on an average yearly. One of the speculators employed, till the year 1889, in Florida alone more than 50 alligator hunters, who delivered nearly every day 300 to 400 skins. For skins measuring over 2 yards $1 was paid. Smaller skins brought only 10 cents. In Louisiana more than 500 men made alligator hunting their business. Carrying bright lanterns in front of their hats, they rowed out in the night-time. Attracted by the lights, the alligators appeared in numbers and could be killed easily by a sure

shot. In Louisiana it happened that in some of the many lakes and lagoons 1000 alligators or more were dispatched in a few nights.

To-day the alligator begins to be scarce. The rodents, however, especially the rats, who formerly were destroyed by the alligators, have increased to such an extent and do such fearful damage to the cornfields, that the governments of the southern States not only found it advisable to put the alligators under the protection of the law, but to ask the United States Fish Commission to restock the rivers and lakes with these old time valuable saurians by breeding them artificially.

North America possessed a hundred years ago a fine fauna of "fin-footed" (pinniped) animals: two kinds of monster walruses, the Stellars Sea Lion, the Fur Seal or Sea Bear, the Californian Sea Lion, the Sea Elephant, and eight more species of true seals. All of them have sad stories to tell of the persistent persecution by men, who thinned their numbers almost to annihilation. None fared worse than the *fur seals* or *sea bears*, the most celebrated of all our fur-bearers. Notwithstanding it has contributed more to the world's wealth than any other wild animal, it has been treated with monstrous cruelty. The manner in which it has been slaughtered is another painful commentary on man's cupidity.

Not only have the seals been massacred wholesale, but men killed one another in order to get more seals. And several times the controversies between the governments of England and the United States became so hot and bitter, that they nearly resulted in war.

Seals had been hunted during the first half of the 19th century in many islands of the Pacific Ocean. Hundreds of ships sailed forth every year, to return with such heavy

loads of skins, that the prices dropped to $3 or $4 each, and sometimes as low as 50 cents a skin. The ravages done became so great that the seals disappeared from the South Sea Islands. Only three herds were left, two of which retreated to the coasts of northeastern Asia, while the third sought refuge in the rocky islands and coasts of British Columbia and Alaska. Spending the winter in that part of the ocean which lies between the 35° N. B. and 125 to 170° W. L., the seals travel in spring to the Bering Sea, to make the Pribyloff Islands their breeding ground.

But peace was not accorded them. The skin-hunters followed them to repeat their slaughter. When in 1867 Alaska and the Pribyloff Islands became the property of the United States, it was estimated that already about 2,000,000 of skins had been taken away from the islands, and conditions had become so serious that the destruction of the entire herd seemed only a question of a few years.

The first attempt to estimate the number of seals on the Pribyloff Islands had been made in 1874 by Henry W. Elliott, who came to the conclusion that the whole herd contained about 3,198,420 seals. Ten years later this number had decreased to about 1,500,000 of all grades. In 1895 it had gone down to a total of 475,000 and in 1907 to only 172,512, though the American Government had taken the greatest pains to protect the seals. It leased the exclusive privilege of annually killing 100,000 superfluous young males on land to the "Alaska Commercial Company," receiving from the lessees between 1870 and 1890 for this privilege almost $6,000,000.

When the decline of the herd became apparent, the quota allowed was reduced to 25,000 and in 1893 to 15,000. To give the seals a further protection, the govern-

ment in the Paris Tribunal of Arbitration in 1895 insisted not only upon a closed season, May to July, but also upon a protected zone of 60 miles radius about the Pribyloff Islands, to provide a safe feeding ground for the mother seals, while their young were dependent upon them. But all these regulations have been in vain. The herds are constantly attacked by so-called "pelagic sealers," who cruise about in their sailing vessels. When a herd of seals is seen, small boats, ten to thirty in number, are lowered, the crews of which kill every seal they find feeding or sleeping upon the water. As it is impossible to distinguish the sex of the seals in the water, the hunters kill bulls and bachelors as well as the females. As these "raids" are made in the breeding season, every dead cow means also the starving of her pups which she left on land, and which are too small and feeble to care for themselves. In 1895 a careful count of the dead pups found at the close of the season was made. The census reached 27,000, not including those in the last stages of starvation.

The exhibition of these helpless offspring, starving in the greatest agony imaginable, is, as Henry Elliott describes it, so very cruel and horrible that if it did not occur so far away, the authors and perpetrators of the diabolical mischief would be jailed and punished like felons.

But the loss of the pups, repeated every year, is not the only one caused by "pelagic sealing." Seals which are feeding, show themselves head and neck out of the water, at irregular intervals. These seals thus engaged, cannot be approached for spearing, so they are shot at. The number killed and wounded by shooting is generally said to be four and five times greater than the number secured after shooting, since a peculiarity of seals is to sink instantly after being clean shot; and also, being wound-

Courtesy of Harper and Brothers

Pelagic Fur-Seal Hunting off Akootan Pass, Bering Sea

ed, one will at once dive and swim away, unless the wound is in the head so as to daze it; then it flounders about on the surface, and is easily picked up by the hunters. In 1891 the pelagic sealers secured 63,000 fur seals in this manner. As it is said by those who carefully studied the question, that three adult seals are lost to every one secured, the 63,000 skins represented a loss of at least 150,000 and as most of these seals were females, the real loss, the starved pups included, may have exceeded 250,000 seals in one year!

Pelagic sealing began in 1879. At that time only two vessels made the experiment. As it proved very successful the number of boats increased rapidly, until in 1895 more than 107 went out from Canadian and American ports alone, their catch amounting to about 150,000 skins! In the last few years the pelagic fleets have been joined by numerous Japanese vessels, the crews of which take advantage of every foggy day, not only to approach close to the islands, but to land near the rookeries, to kill all seals they can get. Several times, when such marauders were surprised by the guards, a hot skirmish followed, resulting in the loss of many lives.

In short the history of the fur seal is so full of horrible cruelty, murder and waste, that we can understand why several members of Congress urged the government of the United States in the interests of humanity to bring the exhibition to a speedy end by turning to the islands and taking the life of everyone of the seals left thereon.

The passing of other great marine vertebrates as the whales, manatees, green and other turtles, is also a question of time only. The relentless warfare to which the different species of whales have been subjected, resulted in the almost total extinction of some of them, as for

instance the Greenland and the Biscayan whale. After the virtual extermination of these two more valuable types, the merciless hunt was diverted to the finback whale, now in turn, with still other forms, destined to extinction.

Dr. G. R. Wieland of the Carnegie Institution of Washington, and Yale University, explains in an article about the conservation of the great marine vertebrates (*Popular Science Monthly*, May, 1908) that the great destruction of whales is mainly modern; the first six or seven hundred years of hunting previous to the use of swift launches were not so noticeably destructive. But in these days of steam, and electric light that robs the long arctic night of its terrors, the whale chase goes on very fast. The shot harpoon, the most extraordinary weapon ever used by man in his pursuit of helpless animals, is doing its deadly work at a terrific rate. The reckless hunt is now largely confined to the finback and to the gigantic blue whale. It is a bloody, brutal butchery, occurring when the females, which show throughout an extraordinary affection, are suckling their young.

Dr. Wieland points out that so far as the United States are monetarily concerned, their whaling industry from 1835 to the wane of the fisheries about 1872, yielded oil and bone worth $272,000,000; this vast sum being the net result of 19,943 voyages with a capture of 300,000 whales.

Taking up another group of great sea animals, Dr. Wieland says, "That no chapter in the story of destruction is quite so harrowing as that of the sea turtles of the southern coasts and islands of the United States—the more so, because it is not only the original supply that has been cut off, but because there is not the least doubt

but that the turtles can with slight expense be increased vastly beyond any numbers ever observed in purely natural environments.

"Yet it has come to pass that the United States Bureau of Fisheries has not during several years of effort been able to secure any eggs whatever of the green turtle on our shores."

Alarmed by these conditions, various scientific societies, as the American Association for the advancement of Science, the American Society of Vertebrate Paleontologists at New Haven, and the New York Zoological Society, recommended such restrictive measures, legislative, internal and local, as will prevent the now imminent extermination of our great marine vertebrates. Dr. Wieland believes that such measures are neither Utopian nor impracticable. "The only element of doubt is whether the volume of sentiment can soon enough make itself felt—in short, whether the race has reached the required culture stage in time. Science has laid low the fallacious theory of fabulous gold dissolved in the waters of the seas, and we no longer heed this phantom of wealth which has deluded credulous minds quite since the days of alchemy. Nevertheless, this old belief may yet find a certain large measure of prophetic fulfilment if man can overcome his habits of wanton destruction before our great marine animals are extinct and the possibility of their preservation on this planet gone forever."

VII

OUR VANISHING BIRDS

Similar to that noticed in the larger game of the United States has been the diminution among the feathered inhabitants of our country. Our birds are fast disappearing.

Only half a century ago America offered to the wing shooter greater attractions than any other country in the world. The wild turkey, one of the noblest of the feathered game, clucked and gobbled in all beech and chestnut forests of the East. The ruffled grouse was an inhabitant of every thicket on the hillsides. "Bob White's" cheerful cry rang in all rural districts; the snipe made the marshes merry in the spring with its shrill "skeap"; the ponds, lakes and rivers were alive with innumerable geese, swans, and ducks; the sky became sometimes darkened by clouds of wild pigeons.

Those golden days of the sportsman have gone. The great flocks of migratory fowl are no longer seen and whole districts once prolific of game birds, are silent and dead, and present not a single feather to the hunter.

When we ask for the cause that led up to the present scarcity of game birds, we must answer again: "Waste! Shameless waste!"

In the days of plenty and abundance men forgot that a time of need might come. Protection and game-laws seemed superfluous and were sneered at by the people as an infringement of their rights. The year was one grand open season from the first of January to the last of December, and the amount of shooting, snaring and trapping done by young and old was only limited by their inclination.

The results of such reckless waste made themselves perceivable in the course of time. First the ornithologists and the sportsmen became alarmed by the decided decrease of bird life in the United States. Birds, once plentiful, had disappeared entirely or greatly diminished in number. Some species were found to be almost annihilated. To determine how far destruction had gone, as well as the chief causes of it, Wm. T. Hornaday, at present director of the "New York Zoological Park," in the year 1900 made an attempt to take a census of our feathered friends. To obtain information he sent inquiries to persons in all parts of the country who were competent to answer. In the first place the list contained the names of ornithologists and associate members of the American Ornithologists' Union. Also many well known sportsmen, guides, collectors of animals and taxidermists were included. Each observer was asked to report whether birds were increasing or decreasing in his locality, how many there were in comparison with the fifteen previous years, what agencies had been most destructive, and what species of birds were becoming extinct in each locality. In each State several observers were addressed, and an effort was made to cover the various sections of each large State. The fact that the inquiry was intended as a step in the direction of preservation awakened keen interest and brought forth reports from nearly 200 observers, representing 37 States and Territories. Fully 90 per cent of the reports had been prepared evidently with conscientious thought and care. Many were very full and particularly valuable by reason of their wealth of detail. The closeness with which the estimates of different observers in a given State or region agreed with one another was quite surprising, and could be justly regarded as

evidence of their scientific value. Almost everywhere the reports revealed a lamentable falling off in bird life, the decrease reaching in many States over 50, and in some States over 70 per cent. Florida stood at the head of the list with a loss of 77 per cent.

The reports further disclosed the fact that the boys of America are the chief destroyers of our passerine birds and other small non-edible birds generally. The majority of them shoot the birds, a great many devote their energies to gathering eggs, and some do both. They have many able assistants, however. Wherever there are birds that can be considered edible, or classed as "game," there the sportsmen, the idler, the farmer and the market-hunter are found, all eager to "kill something" and to make "a good bag;" not to forget the "game hog," who finds delight in having himself photographed surrounded by the fruits of "a day's sport," and regards that photograph as imperfect unless he has 100 dead ducks, grouse or geese around him.

Whatever species of bird-life we may take up, the ravages done by man are noticeable at once. The wild turkey, monarch of all feathered game in North America, has become a "rara avis" indeed. It is confined to a few spots in Southern Illinois and Indiana and to some forests of the Alleghanies, but is surely destined to dwindle away and become extinct.

The same is the case with the swan, the wood-duck, the canvasback duck, the ivory-billed woodpecker, the Carolina Paroquet and a number of other birds.

The pinnated grouse or prairie-chicken, with which only one generation ago the prairies of Ohio, Indiana, Southern Michigan and Illinois were fairly alive, is now to be found only in the western States. And there also

their range is rapidly contracting, notwithstanding the fact, that the prairie chickens are under the protection of the law, and the shooting season is limited to three months.

But the most horrible case of wasteful extermination of animal life by men is that of the passenger pigeon. As its history illustrates best the unpardonable waste of animal life, it may here be told somewhat in detail.

That these pigeons appeared in former times in countless flocks, is known through the descriptions of Baron De La Hontan, the naturalists Wilson, Audubon and many other reliable observers,

Hontan in his "Voyages Dans l'Amérique Septentrionale", states that once passenger pigeons appeared in such numbers near Montreal that the bishop there, fearing for the crops of the colonists, was constrained to exorcise them with holy water, as if they had been demons. And the great naturalist, John James Audubon, writes in his "Ornithological Biography:" "In the autumn of 1813, I left my house at Henderson, on my way to Louisville. In passing over the Barrens, I observed the pigeons flying in greater numbers than I thought I had ever seen before. Feeling an inclination to count the flocks that might pass within the reach of my eye in one hour, I dismounted, and began to mark with my pencil, making a dot for every flock that passed. In a short time, finding the task impracticable, as the birds poured in in countless multitudes, I rose, and counting the dots then put down, found that one hundred and sixty-three had been made in twenty-one minutes. I travelled on, and still met more the farther I proceeded. The air was literally filled with pigeons; the light of noonday was obscured as by an eclipse, and the continued buzz of wings had a tendency to lull my

senses to repose. Whilst waiting for dinner at Young's Inn, I saw immense legions still going by. I cannot describe to you the extreme beauty of their aerial evolutions, when a hawk chanced to press upon the rear of the flock. At once, like a torrent, and with a noise like thunder, they rushed into a compact mass, pressing upon each other towards the centre. In these almost solid masses, they darted forward in undulating and angular lines, descended and swept close over the earth with inconceivable velocity, mounted perpendicularly so as to resemble a vast column, and, when high, were seen wheeling and twisting within their continued lines, which then resembled the coils of a gigantic serpent.

"Before sunset I reached Louisville, distant from Hardensburgh fifty-five miles. The pigeons were still passing in undiminished numbers, and continued to do so for three days in succession.

"It may not, perhaps, be out of place to attempt an estimate of the number of pigeons contained in one of these mighty flocks. Let us take a column of one mile in breadth, which is far below the average size, and suppose it passing over us without interruption for three hours, at the rate mentioned above of one mile in a minute. This will give a parallelogram of 180 by one, covering one hundred and eighty square miles. Allowing two pigeons to the square yard, we have 100,150,136,000 pigeons in one flock!"

Audubon also visited a place in Kentucky, where the pigeons made their roost. "I rode through it upwards of 40 miles, and crossing it in different parts, found its average breadth to be rather more than three miles. Everything proved to me that the number of birds resorting to this part of the forest must be immense beyond conception.

The dung lay several inches deep, covering the whole extent of the roosting place, like a bed of snow. Many trees two feet in diameter, I observed, were broken off at no great distance from the ground; and the branches of many of the largest and the tallest had given way, as if the forest had been swept by a tornado.

"I arrived at this place nearly two hours before sunset. Few pigeons were then to be seen, but a great number of persons with horses and wagons, guns and ammunition, had already established encampments on the borders.

"As the period of the arrival of the pigeons approached, their foes anxiously prepared to receive them. Some were furnished with iron pots containing sulphur, others with torches of pine knots, many with poles, and the rest with guns. The sun was lost to our view, yet not a pigeon had arrived. Suddenly there burst forth a general cry of 'Here they come!' The noise which they made, though yet distant, reminded me of a hard gale at sea, passing through the rigging of a close-reefed vessel. As the birds arrived and passed over me, I felt a current of air that surprised me. Thousands were seen knocked down by the pole-men. The birds continued to pour in. The fires were lighted, and a magnificent, as well as wonderful and almost terrifying sight, presented itself. The pigeons, arriving by the thousands, alighted everywhere, one above another, until solid masses were formed on the branches all round. Here and there the perches gave way under the weight with a crash, and falling to the ground, destroyed hundreds of the birds beneath, forcing down the dense groups with which every stick was loaded. It was a scene of uproar and confusion. I found it quite useless to speak, or even to shout to those persons who were nearest to me. Even the reports of the guns were seldom

heard, and I was made aware of the firing only by seeing the shooters reloading. But no one dared venture within the line of devastation. The uproar continued the whole night. Toward the approach of day, the pigeons began to move off in a direction quite different from that in which they had arrived. And at sunrise all that were able to fly had disappeared.

"The howling of the wolves now reached our ears, and the foxes, lynxes, cougars, bears, racoons, opossums, and pole-cats were seen sneaking off, whilst eagles and hawks, accompanied by a crowd of vultures, came to supplant them and enjoy their share of the spoil.

"It was then that the authors of all this devastation began their entry among the dead, the dying and the mangled. The pigeons were picked up and piled in heaps, until each had as many as he could possibly dispose of. Then upwards of 300 hogs were set loose to feed on the remainder."

Wilson gives similar reports. Between Shelbyville and Frankfort he observed one swarm of fabulous length. It lasted for several hours without diminishing. The naturalist estimated, that this living deluge contained not less than 2200 millions of birds.

Fenimore Cooper's beautiful romance "The Pioneers" contains also a vivid and most realistic description of the annual flights of the passenger pigeon and the methods in which it was captured by the colonists. But one of the best accounts was given a few years ago in the "Chautauquan Magazine," by Pokagon, a converted Pottawattamie chief, of Michigan. "When a young man," so he says, "I stood for hours admiring the movements of these wild pigeons. I have seen them fly in unbroken lines from the horizon, one line succeeding

another from morning until night, moving their unbroken columns like an army of trained soldiers pushing to the front, while detached bodies of these birds appeared in different parts of the heavens, pressing forward in haste like raw recruits preparing for battle. At other times I have seen them move in one unbroken column for hours across the sky like some great river, ever varying in hue; and as the mighty stream, sweeping on at 60 miles an hour, reached some deep valley, it would pour its living mass headlong down hundreds of feet, sounding as though a whirlwind was abroad in the land. I have stood by the grandest waterfall of America and regarded the descending torrents in wonder and astonishment, yet never have my astonishment, wonder, and admiration been so stirred as when I have witnessed these birds drop from their course like meteors from heaven.

"I visited many of the roosting places of these birds, where the ground under the forest trees for thousands of acres was covered with branches torn from the parent trees, some from eight to ten inches in diameter. At such a time so much confusion of sound was caused by the breaking of limbs and the continual fluttering and chattering, that a gun fired a few feet distant could not be heard, while to converse so as to be understood was almost impossible. Between 1840 and 1880 I visited in Ohio, Indiana and Michigan many brooding places that were from 20 to 30 miles long and from three to four miles wide, every tree in its limits being spotted with nests."

To Pokagon, the Pottawattamie chief, we are indebted also for the following graphic description of the methods of catching pigeons employed by the whites: "White men commenced netting the pigeons for market about the year 1840. These men were known as professional

pigeoners, from the fact that they banded themselves together, so as to keep in telegraphic communication with these great moving bodies. In this they became so expert as to be almost continually on the borders of their brooding places. As they were always prepared with trained stool-pigeons and flyers which they carried with them, they were enabled to call down the passing flocks and secure as many by net as they were able to pack and ship to market. In the year 1848 there were shipped from Catteraugus County, N. Y., 80 tons of these birds; and from that time to 1878 the wholesale slaughter continued to increase. In 1878 there were shipped from Michigan not less than 300 tons of these birds. During the thirty years of the greatest slaughter there must have been shipped to our great cities 5700 tons of these birds; allowing each pigeon to weigh one half pound shows 23,000,000 of these birds. Think of it! And all these were caught during their brooding season, which must have decreased their numbers as many more. Nor is this all. During the same time hunters from all parts of the country gathered at the brooding places and slaughtered them without mercy.

"In the above estimate are not reckoned the thousands of dozens that were shipped always to sporting clubs for trap-shooting as well as those consumed by the local trade throughout the pigeon districts of the United States.

"These experts finally learned that the birds, while nesting, were frantic after salt, mud and water, so they frequently made near the nesting places, what were known to the craft as 'mud beds,' which were salted, to which the birds would flock by the million. In April, 1876, I was invited to see a net over one of these death pits. I think I am correct in saying the birds piled one upon

another at least two feet deep when the net was sprung. In counting the killed, there were found to be over 100 dozen, all nesting birds.

"When squabs of a nesting became fit for market, these experts, prepared with climbers, would get into some convenient place in a tree top loaded with nests, and with a long pole punch out the young, which would fall with a thud like lead on the ground.

"In May, 1880, I visited the last known nesting place east of the Great Lakes. It was on Platt River in Benzie County, Michigan. There were on these grounds many large white birch trees covered with nests. These trees have manifold bark, which, when old, hangs in shreds like rags of flowing moss, along their trunks and limbs. This bark will burn like paper soaked in oil. Here for the first time I saw with shame and pity a new mode for robbing these birds' nests, which I look upon as an invention of hell itself. These outlaws to all moral sense would touch a lighted match to the bark of the trees at the base, when with a flash more like an explosion the blast would reach every limb of the tree and while the affrighted young birds would leap simultaneously to the ground, the parent birds with plumage scorched, would rise high in air amid flame and smoke.

"That night I stayed with an old man and explained to him the cruelty that was being shown to the young birds in their nestings. He listened to me in utter astonishment and said: 'My God, is that possible!' Remaining silent a few moments with bowed head, he looked up and said: 'See here, old Indian, you go out with me in the morning and I will show you a way to catch pigeons that will please any red man and the birds too.'

"Early the next morning I followed him a few rods

from his hut, where he showed me an open pole-pen, which he called his bait bed. Into this he scattered a bucket of wheat. We then sat in ambush so as to see through between the poles into the pen. Soon the pigeons began to pour into the pen and gorge themselves. While I was watching and admiring them, all at once to my surprise they began fluttering and falling on their sides and backs and kicking and quivering like a lot of cats with paper tied over their feet. He jumped into the pen saying: 'Come on, you redskin!' I was right on hand by his side. A few birds flew out of the pen, but we caught about 100 fine birds. After my excitement was over I sat down and thought in my heart: 'Certainly Pokagon is dreaming, or this long-haired white man is a witch.' I finally said: 'Look here, old fellow, tell me how you did that.' He gazed at me, holding his long white beard in one hand, and said, with one eye half shut and a sly wink with the other: 'That wheat was soaked in whiskey.'

"His answer fell like lead upon my heart. We had talked about temperance together the night before, and the old man wept as I told him how my people had fallen before the intoxicating cup of the white man like leaves before the blast of the autumn. In silence I left the place, saying in my heart 'Surely the time is now fulfilled when false prophets shall show signs and wonders to seduce, if it were possible, even the elect.'

"In my youth, the countless numbers of the pigeons led me to believe that they were almost as inexhaustible as the great ocean itself. Yet notwithstanding their incredible numbers, great endurance and long life, they have entirely disappeared from our forests. We strain our eyes in spring and autumn in vain to catch a glimpse of these pilgrims."

To this tale of Pokagon hardly anything needs to be added. But from an article of H. Nehrling, a well known ornithologist in Wisconsin, it appears that in that State the repulsive work of destruction hitherto wrought against the passenger pigeons, found at last its end.

When in 1881 large swarms of pigeons nested near Petosky, there appeared more than 500 men, carrying along enormous nets. Each hunter caught during the season about 20,000 birds, which would make 1,000,000 for all. On many days two railroad trains loaded with birds were dispatched to Chicago.

In the following years this wasteful slaughter was repeated. Spies were out watching the location of the roosts, and when these were well established, the main body came on, armed with nets and stool-pigeons. Hundreds of thousands of these birds were taken. Such as had been caught alive were packed into crates and shipped to sportsmen's clubs all over the country. If they survived the stifling coops, it was only to meet a more ignominious death, as they sprang from a plunge-trap with freedom just before them, or were filled with shot and left to die a lingering death beyond the bounds.

All this could not last long. The swarms of pigeons began rapidly to decrease. In 1888 they came for the last time in only small flocks. After these had been bagged, the netting had to be given up through lack of birds. The hunter stared in wonder, hoping for the return of the golden days of old. But in vain. Although the wild pigeons are now protected by law it seems that the very few shattered remnants of the once mighty hosts have left the unhospitable haunts of civilization forever.

While annually millions of birds are killed for food or sport, there are other millions destroyed for the demands

of fashion. Since about the year 1880 queen fashion decreed that complete birds should be used to decorate ladies' hats, the wholesale millinery firms sent out collectors (taxidermists they called themselves), who slaughtered everything which possessed the fatal gift of "plumes," fit to adorn a milliner's window or the bonnet of a Society woman. What fashion decrees must, of necessity, be followed. And so millions upon millions of birds were sacrificed to it without mercy. Some species have been utterly exterminated.

Time was—only a few years back—when the graceful little terns or "sea swallows" were plentiful on our Atlantic beaches. Flocks of these tiny gulls could be seen at the water's edge, on the wave, and on the sand, restless and constantly flying from one point to another. They were bred in great numbers; they laid their eggs in the sand above high tide. But their prettily pointed wings of pearl colour and jet black attracted the attention of queen mode. The "taxidermists" came, and in two or three years had killed all. Now they have disappeared. One New York dealer had at one time in stock 30,000 of these little terns, and one gunner sent to the market over 3,000 of them in one year. 40,000 were killed in one season on Cape Cod, Massachusetts, and an equal number on Cobbs' Island, Virginia.

In the same way Florida has been despoiled of her birds. An examination of the grounds about the mouth of Tampa Bay and the bars off Pass Argille, on the west coast of Florida, in the summer of 1888, showed that not a tern of any kind was breeding where countless numbers had nested only a few years before. Gull Island, off Long Island—a barren patch of sand, only a few acres in extent—and Muskeget Island, off the Massachusetts

coast, are the only localities from New Jersey to Maine, where the once abundant common tern, or sea swallow, can be found in any numbers to-day. Each of these islands now has a keeper who is paid to protect the terns. What an illustration of the results of man's greed and woman's thoughtlessness!

The destruction of herons has been, if possible, even more vile. In 1880 the eastern coast of Florida and the Bayou districts of the Gulf States swarmed with herons, eight different species of them. The white herons, or egrets, which furnish the aigrette-plumes, were so abundant, that the broad savannas were often white with them and the mangrove islets on which they roosted are said to have looked as though a great white sheet had been thrown over them; especially in the nesting season, during which the herons gathered at accustomed places, to rear their young in a sort of communal nursery. Here they would assemble by hundreds, or even thousands of pairs, and in such close company that fifty or even a hundred nests were often built on a single tree.

Unfortunately for these birds, both sexes during the nesting season become adorned with delicate spraylike plumes, the "aigrettes," which constitute the heron's wedding dress and which are worn only during that season. Covetous millinery traders thought these aigrettes valuable acquisitions to their stock and offered to pay 5 cents, 10 cents, and later more than that a-piece. So it followed that the mercenary hunters were set loose upon these birds. In order to secure these plumes at their best, the hunters concealed themselves in one of the breeding grounds or "heronries" and killed the parent birds as they returned with food for their young.

This simple but effective method resulted not only in

the death of the old birds but in the starvation of the young, who stretched their little thin necks and piped piteously a while for the food that never came—for the parents that were murdered at the regular market price of 5 or 10 cents a-piece.

After the "taxidermist" had stripped the dead birds of that little portion of their skins bearing the coveted plumes, they left the bodies to fester and decay where they fell.

"I have heard a plume hunter," says the naturalist Frank M. Chapman, "boast of killing 300 herons in a rookery in one afternoon. Another proudly stated that he and his companions had killed 100,000 birds—herons, egrets and terns—during one winter."

To-day the aigret is the rarest heron in the South. Its history states the correctness of the saying that a bird, of which the feathers have become fashionable, is doomed to almost certain extinction.

Unfortunately, the demands of the millinery trade are not confined to herons and terns. Anything wearing feathers is acceptable, none being too plainly coloured to be worn, birds with bright colours naturally being preferred. And so, after the coasts of the southern States had been devastated, the destruction was repeated in California, Washington and Oregon; and later on in the West Indies, in Mexico, Central and South America. Species that are extensively employed for decorative purposes, as the ibises, flamingoes, roseate spoonbills, king birds, plovers, sandpipers, and others are threatened with extermination the world over.

Collectors of birds' eggs are also responsible for the destruction of the bird species. Scientific societies cut but a small figure. Probably there are not 500,000

specimens in all the collections made in a hundred years.

Much greater harm is done by the eggers, who collect eggs for marketing purposes. In May, 1900, Government Ornithologists reported that on some of the Hawaiian Islands the albatross was destroyed literally in myriads by egg-hunters. Though the birds themselves were not seriously disturbed, the removal of their eggs, not only by the wheelbarrow load but by the carload, must soon result in the practical extinction of the species in that locality.

Of the destruction wrought by egg-hunters in another of Uncle Sam's bird colonies, the *New York Herald*, of May 6, 1900, gave a graphic description, which is here copied.

"Perhaps the most striking instance is afforded by the Farallones, and certainly the most important in a financial way. These islands or, rather, rocks, off the coast of California, thirty miles west of the Golden Gate, are the breeding grounds of myriads of sea birds, chiefly western gulls and murres. For nearly fifty years murre eggs have been collected there and shipped to the San Francisco market, where they find a ready sale at from 12 to 20 cents per dozen, a price only a little less than that of the hens' eggs.

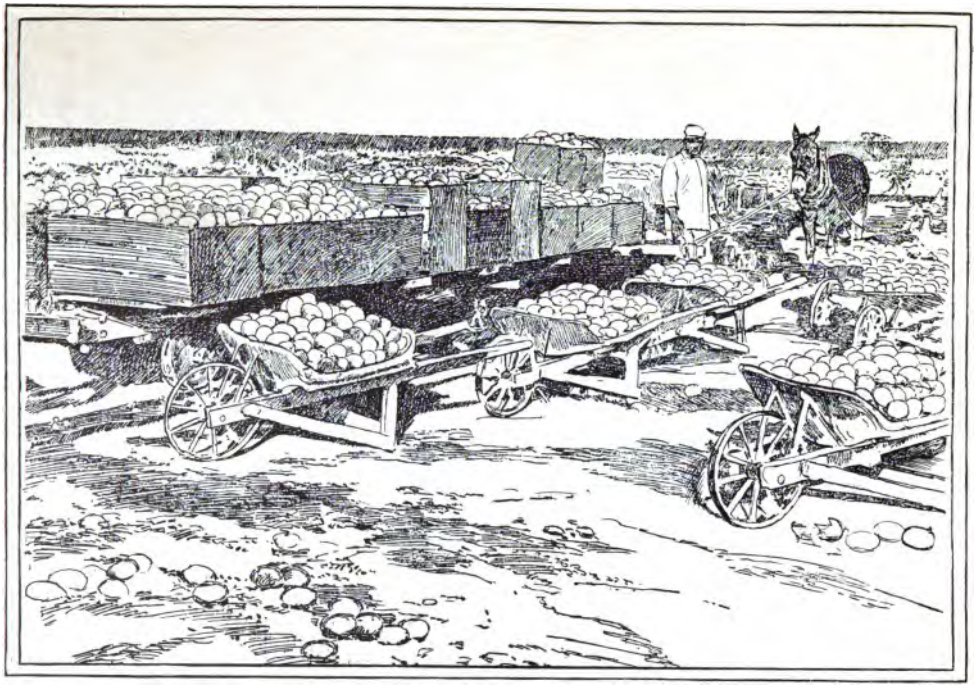
"During the season, which lasts about two months, beginning near the middle of May, the eggs are shipped regularly once or twice a week. The main crop is gathered on South Farallone, the principal island, and chiefly from the 'great rookery' at the west end. The bird lays only one egg, which is deposited on the bare rock. When the season opens, the men go over the ground and break all the eggs in sight, so as to avoid taking any that are not

perfectly fresh. The ground is then gone over every second day, and the eggs are systematically picked up and shipped to market.

"The business is in the hands of Italians and Greeks, and although only a dozen or fifteen 'eggers' are employed, the number of eggs gathered is simply enormous. It is said that in 1854 more than 500,000 were sold in less than two months, while between 1850 and 1856 nearly 4,000,000 were taken to San Francisco. Since then the value of the eggs has declined, and the output has also fallen off considerably. In 1884 there were gathered 300,000; in 1886 about 108,000; while in 1896 the crop was reduced to a little less than 92,000.

"The Farallones being a government light-house reservation, the 'eggers' were allowed on the islands formerly only by sufferance. From 1850 to 1880 the 'Farallone Egg Company' remained in almost undisputed sway, but was dispossessed in 1881 by the authorities. Afterward the keepers employed men to gather the eggs. But in 1897 the attention of the Light-house Board was called to the decreasing number of the birds, and instructions were issued prohibiting further gathering of eggs for market, thus practically putting an end to the business for the present."

The eggs of the Pallas murre are collected for food on the Pribyloff Islands, in Bering Sea, and W. H. Elliott, the naturalist, mentions that on the occasion of his first visit to Walrus Island, in July, 1872, six men in less than three hours loaded a large boat, carrying 4 tons, with eggs to the water's edge. Large colonies of water birds such as pelicans, gulls, terns and herons, may be found at points along the coasts of the United States during the breeding season, and in certain localities the eggs of some



Carting away Albatross Eggs by Thousands

of these species are highly esteemed and find a ready market, as on the eastern shore of Virginia, where the eggs of the laughing gull are considered a great delicacy and are gathered in large numbers for sale to hotels and private individuals. But in the gratification of this taste there is the same tendency toward extermination which is manifested in the case of feather collecting.

Sennett, in speaking of the quantities of eggs—chiefly of gulls, terns and herons—gathered a few years ago along the coast of Texas, says: "There is probably not a port, pass or bay on the entire coast of Texas whose inhabitants do not regularly devote several days each year to what they term 'egging.' All eggs from an inch in diameter upward are taken, excepting, perhaps, those of the pelican, whose eggs are too fishy for any stomach. I have known of boats which came a distance of over 100 miles to gather these eggs, cruising from reef to reef until they secured a good load. For days after the return from these expeditions the shops along the coast expose quantities of birds' eggs for sale, which are disposed of cheaply, according to size. In regard to the profits of the 'egging business,' I doubt if even the most successful 'egger' can make as much money as he could have done had he stuck to his regular and more praiseworthy occupation."

The waste, caused among birds by such reckless men, to satisfy their own greed or women's whims, is dearly paid for by the country as a whole.

Eminent entomological authorities have stated, that at least one-tenth of all the cultivated crops of the United States are annually destroyed by ravenous insects, and that the aggregate amount of damage done is upward of 300

to 400 million dollars every year. In opening the annual session of the National League of the Audubon Societies, in October, 1908, President William Dutcher said: "The products of agriculture and of our forests are the fundamental causes of our wealth. But these products would be impossible without the help of our birds. The damage done to our crops and forests by insects and rodents amounts to $800,000,000 annually! When the public begins to think of these enormous losses, which can be prevented to a great extent by such work as that of the Audubon Societies, I feel convinced that we shall find all the moral and financial support we need."

"The fact," so a bulletin of the University of Nebraska says, "that insect depredations are increasing in extent each year, makes it plain that something must be done to prevent it, and that quickly. We have found that although we are continually making increased efforts to destroy these pests, our efforts avail but little and the destruction of our crops goes on. What then, is to be done?

"The answer is plain. Heed the advice of the naturalist who has made a study of the life histories of the various other living creatures in the world. Do not condemn what he says, without at least examining into it a little. In his desire for bird protection the naturalist is not prompted by sentiment alone; far from it; although from the sentimental standpoint alone the friend of birds would have more than sufficient grounds for making such an appeal.

"Briefly told, the economic relation of birds to man lies in the services which they render in checking undue increase of insects, in devouring small rodents, in destroying the seeds of noxious weeds and acting as scaven-

gers on land and water. A perusal of the various works that have been written on the economic relations of birds to man will support the statement that if we were deprived of the services of birds the earth would soon become uninhabitable."

VIII

OUR DECREASING FISH SUPPLIES

Just as badly as fared our game, fur-animals and birds, so did the fishes of America.

That our lakes and rivers once swarmed with trout, bass, pike and other choice fishes is as well-known as the fact that many of these waters have practically become "fished out," in spite of all the precautions taken by the "United States Fish Commission" for the preservation of their finny protégés.

Fifteen years ago the decline in the catch of trout and white fish in our great Inland Seas became so marked that the government, in connection with Canada, established in 1896 a joint commission, to investigate the cause. From its reports it appeared that the main causes of the falling off were thoughtlessness, greed and waste. The close seasons, when the fish spawn, were never observed and the lakes were sadly over-fished by the use of fine-meshed nets.

It was only with great difficulty and untiring work that the "United States Fish Commission" succeeded in restoring these almost ruined industries to a new condition of productiveness.

The shad fisheries along the Atlantic coast and in the eastern rivers were fifteen years ago also in a state of rapid decline. The great multiplication of all kinds of fishing appliances resulted in the capture of a very large part of the run each season before the shad reached the spawning grounds, and hence the natural increase was seriously curtailed, and, in some streams, almost entirely prevented. Yet the shad catch in-

creased, and for many years the fishery prospered in the face of conditions more unfavourable than those confronting any other fish of our rivers. At length, however, the unrestricted fishing became greedy to an overwhelming extent. The mouth of the rivers and the lower waters through which the shad must pass, became so choked with nets that fishing gear further upstream could make but slender hauls; and for several years came a steady decline in catch. In the Delaware the catch was not worth more than $80,000. In the Connecticut, the total production during the decade between 1879 and 1890 fell from $436,981 to $34,318. In the Hudson, where the catch had numbered several hundred thousand shad annually, it was counted only by the hundreds. Fisheries, engaging thousands of men and producing millions of dollars' worth of food, threatened to become practically extinct.

The Bureau of Fisheries hurried to rescue the shad fishery by propagation. But its great efforts are curtailed, as Deputy Commissioner Hugh M. Smith describes, "By the factor that is also destructive to the fishery. When they first enter the streams the shad are not ripe and are useless to the hatcheries, and the spawntakers must therefore wait for the run farther upstream. But with the recent exhaustive fishing in the salt waters so few fish have escaped that the egg collections have diminished to an alarming extent, being reckoned now in millions where formerly they were hundreds of millions. Under such conditions it is impossible to propagate enough fish to offset the quantities taken, and the shad fishery is fast being deprived of its one support."

Another cause of the decrease in our fish supplies,

and the most destructive one in eastern States, is the pollution of the streams by the refuse of saw and paper mills, starch, beet sugar and glucose factories, oil refineries, distilleries, smelting, chemical and dyeing works.

By this pollution and fouling of water not only the spawn, but also the newly hatched fish and their food perish at once. Adult fish can withstand a certain amount of impurity in water for a time, but eventually they also succumb.

The argument is often advanced that the various industries mentioned must, as a matter of course, be maintained, even at the cost of the loss of all fish life in inland waters. But this is not necessarily the case. The deplorable waste of fish can be prevented, in a great measure, by compelling such plants to run the refuse and waste water in settling ponds before flowing into the streams, as is now being done in many European countries.

To these causes for the decrease of fish in inland waters came during the last decade another agency of fish destruction, so appalling and widespread that in comparison with it all the other causes mentioned sink into utter insignificance. It is the wholesale destruction of fish, both large and small, by the irrigation operations.

While the industries dependent on irrigation are, of course, much more extensive than fishing, this would seem to be no valid reason for overlooking or neglecting the fish life of the streams. The damage to the fish supply caused by irrigation depends on several factors. Thus a large portion of the volume of a stream or even the entire volume may be diverted from regular

channels into irrigation ditches, carrying fish of all kinds and sizes, which eventually perish on the irrigated lands. Again, when a large volume of water is taken from a natural stream the remaining water often becomes warm, stagnant, and unfit for trout or other desirable species. In some States the destruction of fish life from these causes has already become serious and is generally deprecated.

James A. Henshall, in charge of the government fish hatcheries at Bozeman, Montana, in a communication to the outdoor magazine, *Field and Stream*, writes: "No one, except the ranchers and those who have investigated the matter, can have a realization of the awful loss of fish life, of the wanton sacrifice of millions of God's creatures, left to gasp out their little lives on the meadows and grain fields all over the great State of Montana. Often the stench arising from the decaying trout—the loveliest object of God's footstool—is intolerable; 'it smells to Heaven!' Much of the loss might be averted by placing a simple and inexpensive device—such as a paddle wheel or a screen—at the head of ditches, so that the fishes would be frightened away from the intake or prevented from entering. But the last Legislatures of the State have utterly ignored any attempt to prevent the waste.

"There is a needless and unwarranted opposition to the screening of ditches at the intake, not so much on the part of the farmers and ranchers as by the average member of the State Legislature. The rancher knows that the streams are clear of leaves and trash in the summer, and that but little attention would be required to keep the screens clean. I know of ranchers who, of their own accord, have put in screens at the head of

their ditches, and who assure me that but little attention is needed to keep them clean during the season of irrigation. I do not believe that farmers are more selfish or thoughtless than other men, or have less regard for life, even for that of a helpless fish. And if a screen law were enacted I believe it would be cheerfully obeyed.

"But in order to do away with the objection to screens I devised a simple paddle wheel to be placed at the intake of ditches, which, while needing no attention after being put in place, would be more effective in preventing the passage of fish than a screen. Such a provision was included in the fish and game law before the last Legislature, but it was eliminated by the fish and game committee. Comment is unnecessary."

The conditions of the fisheries along the Pacific coast and in the rivers of the adjacent States are also very far from being satisfactory.

In his book, "The United States Bureau of Fisheries," published in October, 1908, by the United States Department of Commerce and Labour, Deputy Commissioner Hugh Smith states that the protection of the salmon fisheries has been "a most difficult problem, as the unheard of magnitude of the resources invited a corresponding recklessness and improvidence. As the canning industry developed, every device that could be used for wholesale capture of fish was put into operation, and gradually all of the favourite streams of the salmon became so blocked with seines, gill nets, traps, barricades and fish-wheels, that but a small proportion of the fish could find passage to the spawning grounds, and the future supply was thus most seriously endangered. As it became soon apparent that the laws and

regulations were inadequate to meet the special conditions prevailing, in 1903 a special commission was appointed to make an exhaustive study of the salmon fisheries and to submit recommendations for its improved regulation. As a result, a new code of laws is now in effect, which may perhaps prevent the threatened decline in these enormous industries."

But wherever we go, the repulsive ravages done by fishermen, the greed of our great canning companies, and an incredible waste of a most valuable food are noticeable. It is possible only in our land of wasters that salmon, one of the finest fishes of the world, is allowed to be converted into an artificial fertilizer. This is done by the "Alaska Oil and Guano Company," which twenty-five years ago established a plant for the production of guano at Killisnoo. There it transforms every year several million pounds of herring and salmon into guano. In 1906 the establishment handled 33,500 barrels of herring and 18,000 barrels of salmon, and kept two steamers for fishing purposes. There were many objections to such an ignoble use of choice food fishes, but we have not heard yet that this shameful waste of Nature's precious gifts has been forbidden by law.

The famous salmon industry of the Pacific States would be most assuredly a thing of the past, if the United States Commission of Fisheries had not come to the rescue and saved the salmon from complete destruction. But its efforts are not at all appreciated yet. We find in the official reports many complaints that the fish-culture work of the "Bureau of Fisheries" and of the "State Fish Commission" are counteracted, and that valuable station property is rendered entirely

worthless through the failure of the States to afford proper protection to the fishes.

The report for the fiscal year 1905 says, for instance: "The salmon fisheries of the Pacific States are so extensive and exhausting, and the property interests involved are so valuable, that every precaution should be taken to insure the unimpaired perpetuation of the various species of salmon, as has been done in California. It would appear, however, that elsewhere the trend of public sentiment is in the direction of the greatest freedom of fishery, with little or no regard for even the near future. This is shown by the curtailing of already too short closed seasons on the Columbia and other rivers, by the erection of impassable dams in streams that salmon are wont to ascend to spawn, and by the unrestricted operation of fishing devices in localities where they are known to be unnecessarily destructive. A pernicious example of the last-named condition is the multiplication of pound nets and gill nets about the mouth of the Skagit River on Puget Sound, notwithstanding the well-known facts that it is the only stream in that region in which there is a noteworthy run of blueback or sockeye salmon for spawning purposes, and that the only hatchery operated chiefly for this species is located on Baker Lake, at the head of that stream. In 1905, some of the pound nets in question took 10,000 bluebacks in twenty-four hours, and the entire run of fish for reproductive purposes was reduced to 2,500. The present indications are that the Baker Lake hatchery may shortly have to be abandoned, because the run of fish will have been annihilated.

"The attitude of indifference on the part of particu-

lar States to the preservation of valuable natural resources like the freshwater and anadromous fishes and the lack of appreciation of the beneficent work carried on by the government through the Bureau of Fisheries, demand serious attention. It is respectfully recommended that consideration be accorded the proposition to discontinue all government fishery work in those States that exhibit no healthy sentiment in favour of the preservation of their supply of food and game fishes, Congress being asked to grant such authority, if necessary."

Threatened with extinction are also the lobsters. Twenty-five years ago they were very democratic shellfish, and sold for 5 cents a pound, fresh. Even workingmen could afford to eat them twice a week. They were good-sized fish, too, in those days, and the lobsters, sold in the markets, weighed from 2½ to 6 pounds or more. Now the price has gone as high as 30 and 35 cents for lobsters that will not weigh more than 1½ pounds, and barely measure within the legal size.

This decline of the lobster fishery is due, as in all other cases, to reckless and illegal fishing. The supply is unequal to the demand. More lobsters are annually destroyed than can be raised by artificial propagation, which is totally inadequate to accomplish the task of restoring the depleted waters.

While the hatching of eggs on a large scale is a comparatively simple matter, the rearing of the young lobsters through their defenceless larvæ stages to the age when they are able to take care of themselves, is a problem which has frequently been considered by fish culturists, but appeared to present insurmountable difficulties, as all attempts to retain the fry in the hatchery

for any length of time proved futile, the mortality being astonishingly great. The larvæ were therefore planted immediately after hatching. But as the young lobster is threatened by so many enemies, only one in 5,000 survives.

The greatest number of lobsters artificially hatched and liberated in a single year in Newfoundland, Canada and the United States combined, was 702 288,000, in 1894. This number would yield, at the above rate, no more than 140,457 adults, while in a single year (1892) 68,000,000 lobsters would have been captured in Canada alone. No number of animals, however large, can stand such a heavy drain. In order to put an equivalent number of lobsters back to make good this loss, not half or three quarters of a billion would have been hatched, but 340,000,000,000, or not far from 500 times as many as were actually planted. In this case man has attempted by working on a small scale to stem the tide of destruction, which Nature, working on such a vastly larger scale, has been unable to do.

The lobster fry planted by the hatcheries of the United States has been as follows:

Fiscal year	Number
1888	1,800,000
1889	1,574,000
1890	4,511,000
1891	3,533,500
1892	5,799,000
1893	8,818,000
1894	78,398,000
1895	71,000,000
1896	97,079,000
1897	115,606,065

1898	95,234,000
1899	108,463,000
1900	77,166,000
1901	60,879,000
1902	81,020,000
1903	68,631,000
1905	116,214,000
1906	167,909,000
1907	180,933,000

While it cannot be doubted that these efforts of the Government have been beneficial, they have not done more than retard the decline, and recently the lobster catch in certain sections has been so reduced that the supply of eggs for hatching purposes has greatly fallen off, and the conditions have become most serious.

Overfishing and disregard for protective laws are responsible for the present condition of affairs. All the States on the New England coast have enacted laws prohibiting the sale or possession of lobsters below certain sizes, and all prohibit the destruction of the egg-bearing females. But the enforcement of these laws seems to be impossible and it is safe to say that very few of the lobsters caught, no matter what their size or condition, are returned to the water. Just as the hunter and game dealer ship game in times out of season to the cities in barrels, marked "pork" or "potatoes" or anything which happens to strike the shipper's fancy, so the lobstermen send the smaller crustaceans into the interior states, where there are no lobster laws.

The oyster industry of the United States is also in a steady decline. Maryland, once the foremost in

oyster production, and the last to resort to systematic cultural measures, affords the most notable example. The laws controlling the fishery in Chesapeake Bay have been designed to protect the natural beds, but have not encouraged or protected the oyster planter, and the natural beds, thus practically the sole reliance, in time failed to sustain the tremendous draft upon them. Between 1880 and 1897 the product fell 31.6 per cent; in 1904 it was 39 per cent less than in 1897.

America is rapidly becoming the continent poorest in animal life. Its forests and plains are silent and dead, our streams barren and lifeless. Instead of the happy song of birds, we hear the shrill noise of devastating locusts and grasshoppers, or the hum of innumerable swarms of mosquitos, who long for our blood, and load us down with the germs of malaria and other dangerous diseases.

IX

THE WASTE OF PUBLIC LAND AND PRIVILEGES

When the establishment of the United States of America had become an accomplished fact, it was decided that all land, formerly held by the British crown and so far unoccupied by settlers, should be turned over to Congress to be held in trust for the benefit of the whole nation. To stimulate colonization the government might dispose of this land either by sale to actual settlers or by granting it to schools and other public institutions, or to corporations, deserving encouragement and aid in the construction of railroads in parts of the country, where otherwise land would be unprofitable.

Before 1862 the grants were made to the States in order to enable them to extend aid to corporations within their borders. To every State, at its admission, Congress gave 5 per cent of the public lands within its limits on condition of the exemption of the remainder from State taxation.

When these stipulations were made, Uncle Sam found not less than 1,441,436,160 acres at his disposal, an amount of land ten times as large as Germany and many times larger than England. The supply seemed inexhaustible. It would last, as everybody thought, for many hundred years to come. In this belief Uncle Sam, liberal by nature, became a spendthrift, a squanderer. He threw away his abundance, right and left, to everybody who came to ask for it; and did not care if he was defrauded besides. When the railroads of the Centre States and our Far West were planned, Uncle Sam subsidized them in a lavish manner, unheard of before. Without cost

they received tracts of land larger than many European kingdoms.

The first grant was made in 1850 and consisted of 2,595,133 acres, given to the Illinois Central Railroad. Several railroads in Mississippi, Florida, Alabama, Missouri and Arkansas got more than 10,000,000 acres. The Union Pacific, with its different branches, swallowed more than 32,000,000 acres; the Central Pacific with its branches more than 13,000,000 acres. Later on this policy of land grants became even more extravagant. Especially the Southern Pacific, the Atlantic Pacific and the Northern Pacific Railroads received enormous stretches of land. The last named road, together with its branch lines, got more than 57,000,000 acres. In all 110,320,440 acres have been granted to railroads up to 1908. No wonder that, when Uncle Sam some day made an inventory, he found that an enormous part of his estate was gone.

But he had never learned to economize, nor was this to his taste. And so he spent of the remaining lands so much more, that on July 1, 1908, Alaska excluded, only 386,873,787 acres were left.

In this remainder all the great mountain ranges, deserts and barren lands are included. Only a comparatively small portion is fitted for general agriculture. And so the saying, that "Uncle Sam has enough to give us all a farm," became a thing of the past.

The most deplorable part of this history is, that an excessive share of these public lands did not, as it should have done, benefit the settler, but has been diverted to the enrichment of speculators and wealthy syndicates, who swindled Uncle Sam out of the very best pieces of his property, to extort later on high prices from the actual home-seeker.

This swindling and stealing was done by the bunco tactics of certain Senators and Representatives, who cleverly managed to push through Congress innocent looking bills, constructed seemingly for the benefit of home-seekers, but which were in fact most dangerous instruments, by which the government was robbed of many million acres of the finest timber and grazing land. Such a bill was for instance the "Lieu-land law," which as an item in a general appropriation bill slipped through the Congress of 1897, when the session was near its close. It read as follows:

"That in cases, in which a tract of land covered by an unperfected bona-fide claim or by a patent is included within the limits of a public forest reserve, the settler or owner thereof may, if he desires to do so, relinquish the tract to the government and in lieu thereof select a tract of vacant land open to settlement, not exceeding in area the tract covered by the claim or patent, and no charge shall be made in these cases for the making of the entry of record or issuing the patent to cover the tract selected." Let us see how this law worked.

When the government began to establish forest reservations in the Far West, 4,000,000 acres of land, belonging to the grants of the various Pacific railroads, were included in these reservations. These lands had no value, as they were above the timber line or devastated by fire. As soon as the "Lieu Selection Act" had been passed, the already over-rewarded land-grant-railroads hurried to exchange these 4,000,000 acres of denuded and useless land for an equal amount of the richest grounds on earth, covered with beautiful redwood, pine and fir. And as soon as the exchange was perfect, then the lumber syndicate came and bought the land for $6.00 an acre.

One section of this land cost less than $4,000, but was sold again for $76,000.

In a series of articles "The way of the Land Transgressor," published in the *Pacific Monthly* of 1908, Lute Pease describes in detail the extent of the land-grabbing done under the lieu-land law, which revealed itself as one of the most stupendous raids ever made upon the resources of our nation. This plundering continued till 1905, when the law was repealed.

Another of such laws is the "coal-land act," of March 3, 1873, which provides that any citizen, or one who has declared his intention to become a citizen, may enter 160 acres of coal land for himself, or by association with one or more other persons, 320 acres, upon which having made $5,000 improvement, the company might acquire 320 more, or 640 acres in all. It contains no "perjury clause," compelling an entryman to swear that the land is for his own use and benefit and that he has entered into no contract or agreement for its disposal to another upon patent. Since this exceedingly faulty law was enacted, thirty-five years have passed, during which the loss to the government ran to an almost incalculable amount.

Another of such fine deals was engineered by Senator Fulton of Oregon. By this act 111,000 acres of sagebrush land in the Klamath reservation, worth not more than $1 an acre, were traded for 87,000 acres of finest timber land, which had a value of more than $2,000,000.

So completely organized were the various rings of land stealers that, when President Roosevelt appointed Mr. E. A. Hitchcock as Secretary of Interior, this gentleman remained in office for several years before he could find a way in which to move. United States Senators and Representatives in Congress were in some cases partici-

pants in the frauds and in others partisans of the rings. State and county officials were in collusion. The courts in some instances were the protectors of the men who were fattening on land that belonged to the United States.

The power of these combinations extended into the Interior Department itself. One Commissioner of the Land Office was forced to resign. This was Binger Hermann, of Oregon, who had been a conspicuous politician of his State and had served many terms in Congress. Mr. Hermann returned to his State, was nominated for Congress in order to get a vindication, and was elected to the Fifty-eighth and Fifty-ninth Congress. Then he was indicted three times for violating section 5,440 of the Revised Statutes of the United States, which makes it an offence to engage in a conspiracy to defraud the government.

All over the country officers of the department had to be removed, and men on whom the Secretary could rely were put in their places. In one instance a United States District Attorney had to be removed from office because of his efforts to shield the guilty. In others special prosecutors superseded the District Attorneys. Others had to be told very frankly what their duty was, and the plain intimation was made that they were expected to see that the law was vindicated and the practices broken up.

Of such long standing were the depredations on public lands that it was a firmly intrenched system. Government lands were considered fair prey for anyone who could get them by beating the law. It is no small thing for the head of a government department to order the prosecution of a United States Senator, two Representatives in Congress, all of his own political party, as well as some of the most prominent men in a State. Yet that

was what Secretary Hitchcock did. In consequence, for false entries, for fraud, for conspiracy against the United States, and for various other offences connected with obtaining unlawfully thousands of acres of the best timber land in Oregon, there were indicted John Mitchell, United States Senator; Binger Hermann and John N. Williamson, Representatives in Congress; Henry Meldrum, Surveyor General of Oregon; some of the most prominent attorneys of the State, sheriffs, other county officers and members of the Legislature, in all 110 persons. Of these 18 have been sentenced to prison, including Senator Mitchell, two States Representatives, the President and two members of the Oregon Senate and other officials.

Little less remarkable was the chase of the Interior Department after a Pacific coast ring of land speculators headed by John A. Benson and Frederick A. Hyde, of San Francisco. Associated with them were Henry P. Dimond, of San Francisco, and Joost H. Schneider, of Tucson, Arizona. The department became convinced that these men were engaged in a gigantic conspiracy to defraud the United States of hundreds of thousands of acres of land. The scheme was to get lands in various public land States in exchange for school-lands in the forest reserves of California and Oregon. The titles to these school-lands, it was alleged, had been obtained illegally by means of forgery and perjury, and it was the scheme to exchange these fraudulent titles for some of the best land owned by the government. When proof of the fraud was laid before Secretary Hitchcock, 40,000 acres of government lands had actually passed to the conspirators in exchange for the fraudulent titles.

The department was ready to move, while Benson, Hyde, Dimond and Schneider were resting in fancied

security. Indictments were found without a hint reaching them of what was going on. One of the men came to Washington and was arrested while actually attempting to bribe an employee of the Land Office.

There have also been an unusual number of efforts to defraud the United States of its timber and mineral lands under the "Timber and Stone Act," of August 4, 1892. Under this act any person may make application for 160 acres of timber and stone land, and after the advertisement thereof, the patent issues as a matter of course in thirty days. Speculators have taken advantage of this and have employed in some instances hundreds of persons to make application for this timber or stone land, as the case may be, and turn it over as soon as the patent is obtained. In this way great tracts of timber and mineral lands have got into the hands of large mining and timber companies for a mere song, the actual value being sometimes a hundredfold in excess of the $2.50 an acre paid. These frauds have been unearthed by Secretary Hitchcock and suits instituted to recover the land. To show at what speed the land pirates were going, it may be said that in 1902 there were only 4,022 entries under this act, aggregating 545,253 acres, while in 1903 there were 12,249 applications aggregating 1,765,222 acres.

It is estimated that the amount of land, in these ways and various others stolen from Uncle Sam, is more than 400,000 square miles, twice as much as the entire area of Germany. In it are many million acres which are absolutely essential to the welfare of the country. To get them back will eventually cost the government of the United States hundreds of millions of dollars.

As Uncle Sam squandered carelessly a great part of his soil, so many of the States, cities and communities granted,

through lack of foresight, most valuable privileges, as for instance, water rights, street railway franchises, the privilege of furnishing light, power, etc.

In many instances such grants, the sources of large revenues, have been made, without compensation, to corporations and individuals, who often take no interest in the common welfare, work only for their own benefit and express their utter contempt for the public in general.

The worst and most stupid feature is that hundreds of such privileges have been granted in perpetuity, without any determination when the grants will expire.

And so the dead hands and thoughts and tricks of generations of freebooters and rascals, long since gone, interfere seriously with the wants of the living world of our day as well as with the welfare of those who are to come after us.

X

THE WASTE OF PUBLIC MONEY AND OF PROPERTY

The wasteful extravagance, in which we Americans indulge, poisons also our public life. It leads to the corruption of our officials, aldermen, legislators, representatives and senators, to the misgovernment of our cities and States. This misgovernment, the symptoms of which are waste, corruption and oppression, is a fact known to the whole world.

Nowhere are the expenses of cities and States so enormous and so rapidly increasing as in the United States; nowhere is public money squandered in greater amounts, and nowhere are the actual accomplishments in such sad contrast. Bad work is apparent in all parts of our cities; in many places the streets are outrageously neglected.

The City Hall at New York, the Capitols at Albany, N. Y., and at Harrisburg, Pa., the City Hall at Chicago and numerous other public buildings and public works, are lasting monuments of infamous waste, extravagance and corruption.

How many employees there are in the municipal service of the city of New York, and just how much their wages amount to, no city official can tell. Repeated efforts to get these facts have failed. All we know is that their salaries in 1907 amounted to $70,000,000; that in 1908 these wages increased to $80,000,000, and that the budget for 1909 asks more than $100,000,000 for that same purpose. These vast sums

are expended without control and without examining their justification.

And it is also a well-known fact that our cities for all supplies and materials, although these are purchased in large quantities against cash, have to pay much higher rates than anyone else. Besides, these supplies are quite often of inferior quality. The same is the case with repairs. Public works, as street cleaning, etc., are given, without public bidding, at exorbitant rates, to the friends of politicians. In New York, for instance, the Department of Street Cleaning some years ago forced through a contract for the disposal of garbage at three times the rate of the previous contract, after stifling competition by queer advertising and technical methods.

As similar conditions prevail in other departments, we need not wonder that the budget of New York is twice as high as that of Paris, four times as high as that of Berlin, and five times higher than that of London. In 1908 it amounted to $135,474,403. For 1909 the budget will be $156,545,748.

We find the same state of affairs in almost all of our large cities, many of which stagger under the direct loads of heavy taxation and bond issue, and are bleeding at every pore from the indirect exactions of official and political conspirators, who amass immense fortunes, in many cases without having visible legitimate means of support.

The people look at such indirect peculations and the waste of public money by the officials with utter indifference, without realizing that these spoils and extravagances are a drain directly upon their own pockets.

Ignorance and carelessness are also the causes of

incalculable wastage through fire. *McClure's Magazine* for November, 1908, has a very interesting article about that subject, written by F. W. Fitzpatrick, consulting architect of the International Society of State and Municipal Building Commissioners and Inspectors. This gentleman states that fires cost us as many as 7,000 human lives in one year's time, and that our loss in money value, through the destruction of property, is almost as appalling. He says: "The production of gold in the entire world, something like $400,000,000 per year, would not recoup us for our losses by fire and the incidental expenses accompanying them in the same period of time; the value of all the coal mined in this country in a year's time would just cover the cost to us of our fires; the value of our lumber production is only a trifle more. We are great and persistent advertisers, and spend huge sums in that accessory to business, but, vast as our advertising bill is, it equals but two-fifths of our fire bill; and all the industrial dividends paid in 1907 aggregate but three-fifths of the amount of our fire extravagance.

"In 1907 there were no great conflagrations; it was what might be termed a 'normal year;' but we actually destroyed buildings, and property contained in them, to the value of $215,000,000. This figure represents total annihilation; there was no residue, it was not money diverted into other channels, one man's loss and another's gain; it stands for just plain smoke. Beyond this, we expend in the maintenance of fire departments, apparatus, high pressure systems, and all those so-called, yet often ineffective, curative agents of the evil, $300,000,000; and we further pay out another $195,000,000 in a gamble with the insurance companies,

in a bet that our property will not burn. Of that last sum, a scant $95,000,000 is returned in the way of paid losses. In other words, the cost of fire and its accessories, in round numbers is just about an even $600,000,000 a year.

"Our average fire loss is $19,000,000 a month—a 'normal' month. In February of 1904 Baltimore raised that month's figure to $90,000,000, and in April of 1906 San Francisco added $350,000,000 to the 'normal' month's loss."

We are in a position to publish here a table of the annual fire losses in the United States for the thirty years, 1875 to 1907.

YEAR	AGGREGATE PROPERTY LOSS	YEAR	AGGREGATE PROPERTY LOSS	YEAR	AGGREGATE PROPERTY LOSS
1875	$78,702,285	1886	$104,924,750	1897	$116,354,370
1876	64,630,600	1887	120,283,055	1898	130,593,905
1877	68,265,800	1888	110,885,665	1899	153,597,830
1878	64,315,900	1889	123,046,833	1900	160,929,805
1879	77,703,700	1890	108,993,792	1901	174,160,680
1880	74,643,400	1891	743,764,967	1902	161,488,355
1881	81,280,900	1892	151,616,098	1903	145,302,155
1882	84,505,024	1893	167,544,370	1904	230,520,131
1883	100,149,228	1894	140,006,484	1905	165,227,650
1884	110,008,611	1895	142,110,233	1906	518,611,800
1885	102,818,796	1896	118,737,420	1907	215,000,000

Taking the total loss from fires in 1906, which was unusual, we find that the per capita loss for that year is $6.10. The average for the last ten years is $2.70, while in all of Europe the average corresponding tax is a trifle less than 33 cents per capita.

Mr. Fitzpatrick points out that Europe has 0.86 fires to each thousand people, while we have 4.05 fires.

In all London there are 3,843 fires in a year, while New York City has 12,182 fires a year.

"In Europe they have always used less combustible material in construction than we have; wood has been less plentiful than here; they are more careful, and, as a matter of fact, a fire scarcely ever goes beyond the building in which it originates, whilst here hardly a day passes that we do not read of a fire destroying two, three, twenty, forty buildings at one fell swoop.

"The worst thing is that there is here such apathy in regard to fire. It is accepted as a sort of necessary evil. Yet tremendous efforts are made and vast expenses incurred in attempts to cure the evil. Our fire departments are the best in the world, and small wonder—they have so much practice that they necessarily become adept. But little by little we are awakening to the realization that cure is well-nigh impossible and have turned our attention toward prevention. It has been found to work satisfactorily in the elimination of epidemics and fevers that used to be thought almost ineradicable; our medical men are centring their efforts upon sanitation and such preventive measures, instead of trying to fight plagues and diseases after they have taken hold.

"Our people are peculiarly slow in learning such lessons. For instance, it was known for years that the great bulk of our theatre buildings were ramshackle affairs, where the danger of fire and panic was especially imminent. Well, a long list of fatalities, culminating in the holocaust of the Iroquois Theatre in Chicago, finally gave emphasis to the need of reform, and immediately there was a great scurrying, not to remedy the defect in every dangerous building, but

to make theatres, particularly, safe. This is all very good, but why must intelligent people suffer a terrible catastrophe before they will take general precautions against the possibility of such an occurrence taking place? So with schools. Anything had been thought good enough for a school. There were school fires and panics and heart-breaking individual losses, but it took the Collinwood disaster to wake the nation up, and now there is a possibility that our future school buildings will be well built, or at least fairly so. But there interest will cease, and we shall have to have a terrible fire in a department store, and then in a church, and another in a hotel, to get each class of building properly safeguarded."

XI

THE WASTE OF HUMAN LIVES

In our mad rush for profits and spoils we not only waste and destroy our material resources, with which Nature has so bountifully endowed us, but we also waste annually hundreds of thousands of human lives. Nowhere are human lives so cheap as in the United States, which surpass all other countries in the number of unfortunate beings sacrificed upon our industrial battlefields; sacrificed through the same carelessness which characterizes so many of our undertakings.

There are only a few statistics about the accidents occurring in our country, and they are not very reliable. For that reason we are unable to say if the assertion, made by an American scholar, is correct, that in every minute of the year, one labourer—man, wife or child—is carried either into the hospital or to the grave-yard.

In all civilized countries, except the United States, great care is taken to prepare correct lists of such losses which the nation suffers. This is done to find not only the causes of such losses, but to discover the means by which they may be lessened or prevented, as the loss of the life of every labourer means a loss to the national wealth.

America keeps strict accounts of the number of cattle and pigs brought to market and transformed into provisions, but does not record the unfortunate workingmen, who are killed or maimed in the whirl of American life and industrialism. If such statistics existed, the records not only would start a cry of horror but would result in the demand for preventive legis-

lation by which this enormous waste of useful lives might be checked *

Of railway accidents we have reports compiled by the "Interstate Commerce Commission," which give for the years 1897 to 1907, the following numbers:

YEAR ENDING JUNE 30TH	NUMBER OF PERSONS KILLED	INJURED
1897	6,437	36,731
1898	6,859	40,882
1899	7,123	44,620
1900	7,865	50,320
1901	8,455	53,339
1902	8,588	64,662
1903	9,840	76,553
1904	10,046	84,155
1905	9,703	86,008
1906	10,618	97,706
1907	11,839	111,016
Total	97,373	745,992

From these reports it will be seen that since 1897 the number of killed has almost doubled, while the number of injured has trebled.

The steady and rapid increase of these accidents surpasses that of any other country and shows that the conditions of our ever increasing commerce are far from

* When the writer inquired at the National Conservation Commission at Washington, D. C., about statistics of the losses of life in factories, he received the following letter, which speaks for itself: "We asked the Bureau of Labour, Department of Commerce and Labour, for any statistics of the losses of life in factories. They tell us that up to this time no reliable statistics on this exceedingly important subject have been gathered. They themselves endeavoured to compile the data, but found that no State had an adequate force of men to carry out the work even when it was attempted."

being satisfactory, and that, to diminish this stupendous waste of human lives, the improvement of our means of transportation is a paramount question. The whole transportation service is not only insufficient, but also sadly antiquated. While in all other countries dangerous grade-crossings are abolished or carefully guarded, there are in our country still numerous companies which permit their railroads to thunder through our crowded streets day in and out, killing or maiming unfortunate persons by the scores. As long as our own children, wives or friends are not the victims, we do not care much, but tolerate in criminal negligence the continuance of conditions, to which we ourselves may perhaps fall a victim in the very next hour.

There are laws to safeguard the welfare of the public, but as in so many other cases, these ordinances are not enforced by the officers appointed and paid for that purpose. * Otherwise, such horrible disasters as the burning of the steamer "Slocum," in June, 1904, which resulted in the loss of 1,020 lives, could not have been possible. Had the fire apparatus and the saving devices been properly inspected, as prescribed by law, the whole catastrophe might have been prevented.

* S. O. Dunn, Western Editorial Manager, *Railway Age Gazette*, makes in the *Technical World Magazine* for November, 1908, the following remarks: "For the prevention of railroad accidents, two things are necessary, a good physical plant, and conscientious, skilful working of the plant. The latter is the more important. The best is worthless if inexpertly and recklessly operated."

And further he says: "There is still a great deal of very bad track in the United States . . . The enormous growth of traffic has been largely responsible for the increase of railroad accidents, but the statistics of the Interstate Commerce Commission demonstrate that about 75 per cent of these train accidents and fatalities are due to the reckless disregard and violation by employees of rules established for their protection and that of the public."

Far less definite than our knowledge about railway and steamboat accidents is our knowledge of accidents occurring in the industrial establishments, the building trades and mines of the United States. The fact that so far only ten of our States—New York, Rhode Island, Pennsylvania, New Jersey, Massachusetts, Ohio, Indiana, Wisconsin, Missouri and Minnesota—have made attempts to collect statistics about the accidents in their factories, indicates the deep rooted indifference of the American people in general and of the legislators in particular toward the welfare of the labourers. The New York Bureau of Labour estimates the number of persons killed in the industrial establishments of the United States, at about 10,000 annually; the number seriously injured at about 68,000, and those with slighter injuries at about 400,000.

The casualties in the building trades, some of which are very perilous, are not represented by any statistics.

Of the 30 States, engaged in mining, only 13 collect and publish information about the accidents which occur in the mining of metals and coal or in the quarrying of stone. We know practically nothing about the losses our army of labourers suffer annually in the gold, silver and ore mines of our country. We are better informed about the accidents in coal mines. It is a fact that in no country in the world are the natural conditions so favourable for the safe extraction of coal as in the United States. But in spite of this the number of lives lost per mille employed is far higher than in any other coal producing country. And while the number of men killed in coal mines is in all other countries decreasing, the number killed in the United States is increasing from year to year.

In Belgium, the number of men killed of each 1,000 men employed in coal mines sank from 3.19 in 1831 to 0.94 in 1906. In Great Britain from 1.50 in 1891 to 1.29; in Prussia from 2.66 in 1861 to 1.80 in 1904; in France from 1.03 in 1901 to 0.84 in 1905. In the coal mines of the United States it rose from 2.67 in 1895 to 3.53 in 1905. As the decrease in the European countries is solely the result of mining legislation for the safeguarding and the protection of the lives of workmen, and has been made possible by establishing testing stations for the study of problems relative to safety appliances for mining, including the use of explosives, the increase in the United States is due to the lack of such institutions and to the lack of proper and enforceable mine regulations.

The total number of men killed in the coal mines of the United States during the period 1890 to 1907 is 25,965. In 1907, 3,125 coal miners were killed and 5,315 injured. The death record during that year was greater by 1,064 than in 1906 and it is said to have been the worst year in the history of the coal mining industry.

Now let us add the figures of all accidents which result from the different causes.

NUMBER OF PERSONS KILLED AND INJURED

Railroad accidents in 1907	122,855
Accidents in mines during 1907	8,440
Probable minimum number of accidents in factories, etc., during 1907	478,000
Aggregate loss of human lives in fires in one year	7,000
Total	616,295

316,295 persons killed, maimed and injured in a year! Nearly twice as many as were killed and wounded in the Russo-Japanese war! That appalling figure makes us shudder.

If so many persons were killed or wounded in one hour at one place, the whole world would be shocked and terrified, and offers of aid and sympathy would come to the nation thus bereaved. Because these losses are distributed over a whole year, they are none the less a heavy burden on the nation and cost it hundreds of millions of dollars, not to speak of the distress and sorrow connected with it.

The question naturally arises: "Is it necessary that so many lives should be sacrificed?"

The comparison of European records with our scant ones shows that a great proportion of our accidents is wholly needless. Many result from the most prevalent and most contagious American malady: mad, unreasoning haste that involves carelessness, recklessness, selfishness, stupidity and brutality.

Taking risks everywhere, we jump on trains, street cars and steamers while they are starting, or allow ourselves to be dragged aboard at the very last minute. We do not hesitate to cross railroad tracks and streets at the most perilous moments, when we may find ourselves between four trolley cars, coming from different directions, or in front of a locomotive, or a swift and noiseless automobile, or under the hoofs of a hansom cab-horse.

In the false belief that everyone is competent to take care of himself, in disregard of the rights and lives of others, we travel in our carriages and automobiles in go-as-you-please fashion, and permit in our

streets, factories, mills and mines the continuance of conditions which, in other civilized lands, have long been condemned as criminal.

Criminal neglect is also the cause of another very great loss of human lives which our nation suffers constantly. It is the neglect to filter the water supply of our cities. Almost all our great rivers are the sewers and at the same time the source of water supply for nearly all the cities located on their banks. The same is the case with the Great Lakes, the basin of which, according to the census statistics, is next to the Atlantic seaboard, the most densely populated area of the United States.

We know that large cities like Buffalo, Erie, Cleveland, Detroit and Milwaukee discharge their sewage into the Lakes, and we also know how Chicago and Cleveland suffered from typhoid fever visitations by contaminating their own water supplies. It is also a well-known fact that many of the river cities were obliged to resort to purification of their water supplies in order to arrest the ever increasing typhoid fever wave.

According to the Census of 1900 there were 35,379 deaths from typhoid fever during the Census year throughout the United States; and based on an estimated mortality of 10 per cent, it is within reason to assume a yearly prevalence of 353,790 cases of this disease. If we calculate the average cost for care, treatment and loss of work to be $300 and the average value of a human life at $5,000, we have a total loss in the United States of $283,032,000 from one of the so-called preventable diseases! Mr. George C. Whipple in his paper, "The Value of Pure Water," presents some striking evidence to indicate that a loss of $10,000

for every death from typhoid fever is a conservative estimate, in which case the decrease in the "vital assets" during the Census year of 1900 would amount to $353,790,000. Reduce the prevalence of this disease one-half (which has been accomplished in Europe and our own country) and the question of the hygienic value of pure water will be answered from an economic point of view.

Mr. Whipple, while admitting that this is merely a transference of money from one man's pocket to another's, emphasizes the fact that "unnecessary expenditure is a loss," and that deaths from typhoid fever and from other diseases represent a very material loss of the productive capacity of a community and consequently a decrease in what may be termed the "vital assets." On page 36 he computes upon what may be regarded as a very sound basis, that "each million gallons of polluted Alleghany River water pumped to Pittsburg has heretofore reduced the vital assets of the community by $110. This for a population of 350,000 amounts to $3,850,000 per year—a sum enormously greater than the annual cost of making the water pure."

The most ridiculous of all our waste of human lives and of property as well, occurs every year on that glorious day which should be observed as a day of genuine rejoicing, but is desecrated by barbarous noise and disorder: the Fourth of July, our Nation's birthday.

Of course, there are no statistics about the price America pays every year for the absurd celebration of that day. If figures could be had they would be so appalling that the knowledge of them would be the most powerful deterrent to the present method of cele-

bration. To show the nonsense of it, the "Journal of American Medical Association" endeavoured for the past five years to collect statistics about the numbers of killed and injured on that day. The figures are not at all complete, as only such cases were considered as were reported by the newspapers. The many thousands which did not come under observation are not included. The figures show that from 1903 to 1907, in the celebration of the Fourth of July, 1,153 persons were killed and 21,520 injured. Of the injured, 88 suffered total, 389 partial blindness; 308 lost arms, legs or hands; 1,067 one or more fingers. July 4th of 1908 surpassed all previous days as a day of terror.

Cold figures give no idea of the anguish and pain of the maimed, of the horrors of so many sightless lives, of the poverty and want of many families who lost their support by the death or maiming of the breadwinner.

But with the number of losses of life or limb, the waste due to the strange celebration of our national holiday is not ended. New York City boasted to have spent in 1906 an amount of 4,000,000 dollars for fireworks, while the country as a whole wasted the enormous sum of 20,000,000 dollars in one day! Finally, we must add to the list of squandered lives, and to the vast sums wasted in fireworks, millions and millions lost in property through conflagrations, caused by rockets and fire crackers, that went astray.

Well may the stranger be amazed in the face of such appalling waste of life and property, but much more so at the apathy of the Nation and the officials, who quietly stand by and look idly at this dread feast of noise, fire, blood and death, and seem neither to understand nor to care.

XII

CONCLUSION

The foregoing chapters cannot fail to convince the reader that our natural resources are being consumed, wasted and destroyed at a rate which, if we persist in following it, must result in the impoverishment of our country and people.

This prospect is not a very pleasant one. Emerson Hough, in his article, "The Slaughter of the Trees," (*Everybody's Magazine* for May, 1908) pictured it as follows: "In fifty years we shall have whole States as bare as China. The Appalachians will be stripped to bedrock. The Rockies will send down vast floods which cannot be controlled. The Canadian forests north of the Great Lakes will be swept away. Our Middle West will be bare. The Yazoo Delta will be ripped apart, because no levee will be able to stand the floods of those days. We shall be living in crowded concrete houses, and at double the rent we now pay. We shall make vehicles of steel, use no wood on our farms. We shall pay ten cents for our newspapers, fifty cents for a magazine, as much for a lead pencil. Cotton will be immensely higher. Beef will cost twice what it costs to-day. Like Chinamen, our children will rake the soil for fuel or forage or food. We shall shiver in a cold, and burn in a heat, never before felt in this temperate zone, meant by God as a comfortable growing place for splendid human beings—unless we make up."

What must we do to be saved from such a dismal future?

First of all, we ought to stop our insane riot of

An Eroded Slope—where the Trees Were Removed the Soil has been Washed Away by Rains

destruction and wasteful extravagance. We must not only learn to economize, but to secure the same intelligent supervision, conservation and development of all our resources that is maintained by other civilized countries, and that should be justly expected from a nation which has produced so many shrewd financiers, enterprizing merchants and manufacturers, bright scientists and patriotic statesmen.

We must impress upon our people the fact that the conservation of our resources is the basis of our national welfare as well as of our national future; and that we, the present generation, have no right to commit the unpardonable sin, to destroy, by wasting our country's resources, the necessities of life of generations yet unborn.

Our lumber and mining industries cannot and shall not be abolished. But such regulations should be made and enforced as will protect our forests and mines against waste and ruin. We should also take proper steps to preserve and develop our water resources and our soil.

By educating our children and fellow-citizens, we must see to it that all useful animals, especially our birds, are no longer persecuted and slaughtered, but find a permanent home in our country, which owes them so much.

To lessen or prevent the tremendous losses by fire, the most stringent regulations should be enacted, positively prohibiting the use of combustible materials in the construction of any new buildings. Fireproof construction should be encouraged by the States. But, as F. W. Fitzpatrick says in his article: "Fire—an American Extravagance"—"the chief thing to us in

building, however, is intelligence. It is a material that has been sadly lacking in our building enterprises heretofore; but they tell us that we Americans can do anything, so surely we can develop that quality and from now on build intelligently, correctly and safely."

We also should take care that by the issue and strict compulsion of laws similar to those in force in Germany and France, the frightful waste of human lives may be diminished.

What we need in this country is to be more deeply impressed with the sanctity and economical value of human life. We are far behind other nations in that respect.

In regard to grants and privileges we should exercise greater prudence and foresight, that what is in equity the property of the whole nation, is not monopolized by a few of the people. And, as it is criminal to fetter future generations with perpetual franchises, we should follow the wise recommendations made by President Roosevelt at the Governors' Conference, where he said:

"My position has been simply that where a privilege which may be of untold value in the future to the private individuals granted it, is asked from the Federal Government, the Federal Government shall put on the grant a condition that it shall not be a grant in perpetuity. Make it long enough so that the corporation shall have an ample material regard. The corporation deserves it. Give an ample regard to the captain of industry, but not an indeterminate regard. Put on a provision that will enable our children at the end of a certain specified period to say what in their judgment should be done with that great

natural power which is of use to the grantee only because the people as a whole allow him to use it. It is eminently right that he should be allowed to make ample profit from his development of it, but make him pay something for the privilege, and make the grant for a fixed period, so that when the conditions change, as in all probability they will change, our children—the Nation of the Future—shall have the right to determine the conditions upon which that privilege shall then be enjoyed."

On the same occasion President Roosevelt said further:

"We are coming to recognize as never before the right of the Nation to guard its own future in the essential matter of natural resources. In the past we have admitted the right of the individual to injure the future of the Republic for his own present profit. The time has come for a change. As a people we have the right and the duty, second to none other but the right and duty of obeying the moral law, of requiring and doing justice to protect ourselves and our children against the wasteful developments of our natural resources, whether the waste is caused by the actual destruction of such resources or by making them impossible of development hereafter.

"Any right thinking father earnestly desires and strives to leave his son both an untarnished name and a reasonable equipment for the struggle of life. So this Nation as a whole should earnestly desire and strive to leave to the next generation the national honour unstained and the national resources unexhausted. There are signs that both the Nation and the States are waking to a realization of this great truth."

The strongest proof of such an awakening has been the conference of Governors at the White House. This noble assemblage was actuated by a high spirit, by true patriotism, business sense and statesmanship. In the resolutions adopted, it explained that the judicious conservation of our resources which, in reality, and in a higher sense, belong not to the individual, but to the Nation, must be the first problem in the policy of our government. When this recommendation becomes a fact, we shall have good reason to hope that our children and children's children may be saved from evil days and want, and that the prosperity of our Nation will continue.